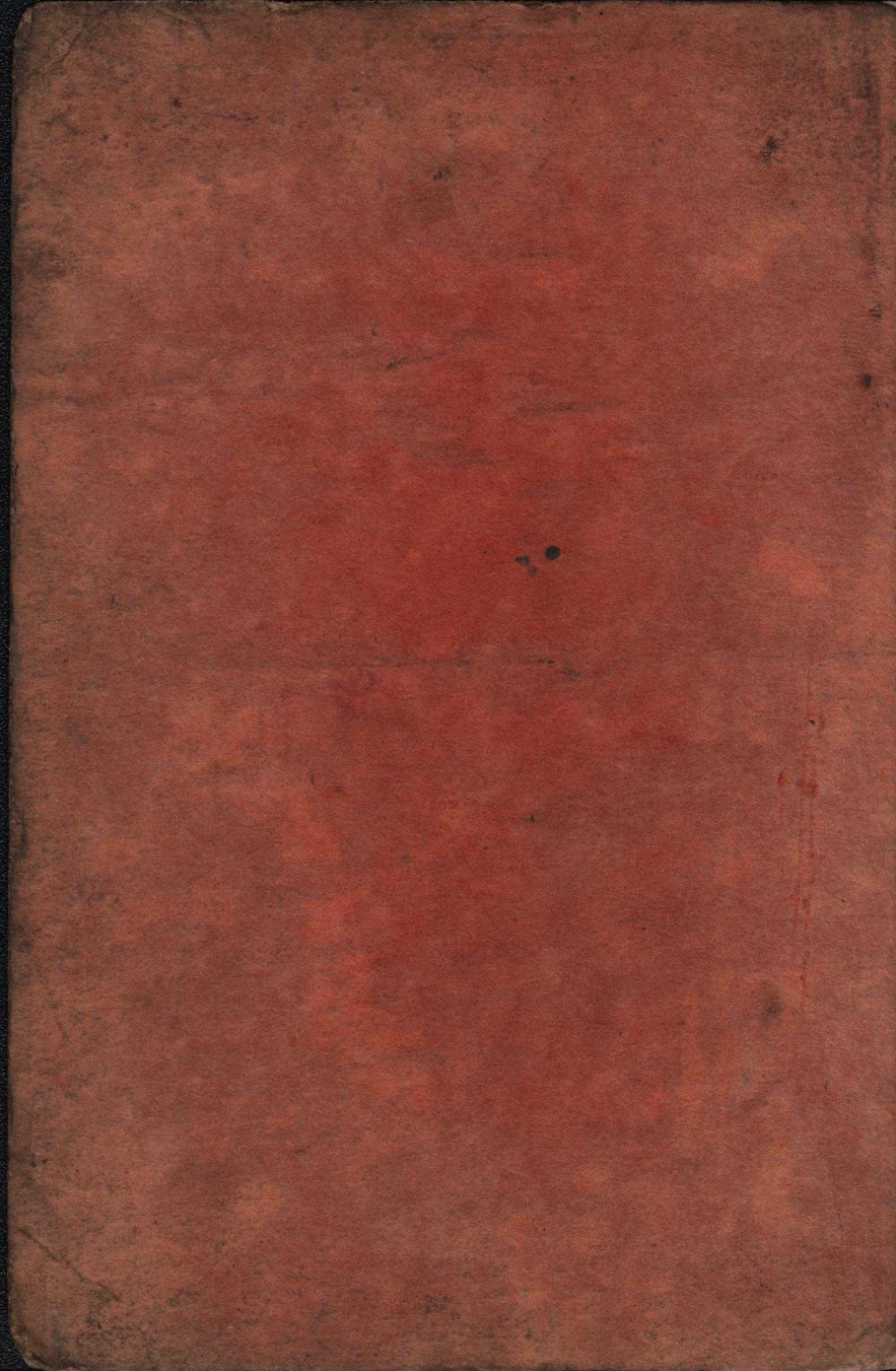


THE
WHITMAN & BARNES
MANUFACTURING CO

TWIST DRILLS
REAMERS
WRENCHES
— and —
DROP FORGINGS

CATALOG No 90
GENERAL OFFICES
AKRON, OHIO



Piston rings are
always $\frac{1}{64}$ of an inch
larger to every inch
in diameter
larger.

11-4-18

Excentric

An excentricity
is used for the
center of the eye to
the center of the shaft



the joint that makes
the low pressure with
the high pressure is
called an articulated
bringe casting

(to make press fits)

You leave 2 thousands
for the first inch dia
and 1 thousand for every
inch after that (as sample)

③ say a shaft 5" in dia
press into a steel hub
it would have to be
4 thousands larger in
dia. but if this shaft
was going to press into
a cast iron hub you
just double the amount
or 12 thousands

(for making running
fits.)

say we have a piece
④ make in dia that
the hub has to go over
we have caliper the
shaft and give the
bushing a ~~fit~~ ^{fit} setting
a fit setting is 1 th thousand

as other for the first
inch or two and of
the hub

INTRODUCTORY

THIS Catalog, Number 90, supersedes all previous editions of our Machinists' Supply Catalogs.

Our Akron, Ohio, factory is devoted exclusively to the manufacture of Carbon and High Speed Twist Drills and Reamers. The organization gives its sole attention to the perfection of this line of tools.

Our Chicago, Illinois, factory produces a superior line of Screw and Drop Forged Wrenches, also specializes on all classes of Drop Forgings.

The "W. & B. Diamond" Trade Marks open and closed are symbols of perfection for all products of our manufacture.

Our factory facilities, stocks on hand and means of distribution afford a service equal to any demands that may be made upon us.

In preparing your specifications and orders, please use at all times the list numbers, and employ the same terms and descriptions given with the lists, both in the headings and foot notes.

By observing this, error will be avoided and shipments facilitated.

Always state on your orders whether shipments are to be made by freight, express or insured parcel post, otherwise we will use our best judgment in shipping.

In your correspondence regarding special tools, please give a concise description and send sample or sketch showing dimensions with your specifications.

We invite your inquiries, and will appreciate consultations regarding any difficulties you may be having in the operation of Twist Drills and Reamers. We can solve them for you from the fund of information at hand based on actual factory working results.

The Whitman & Barnes Manufacturing Co.

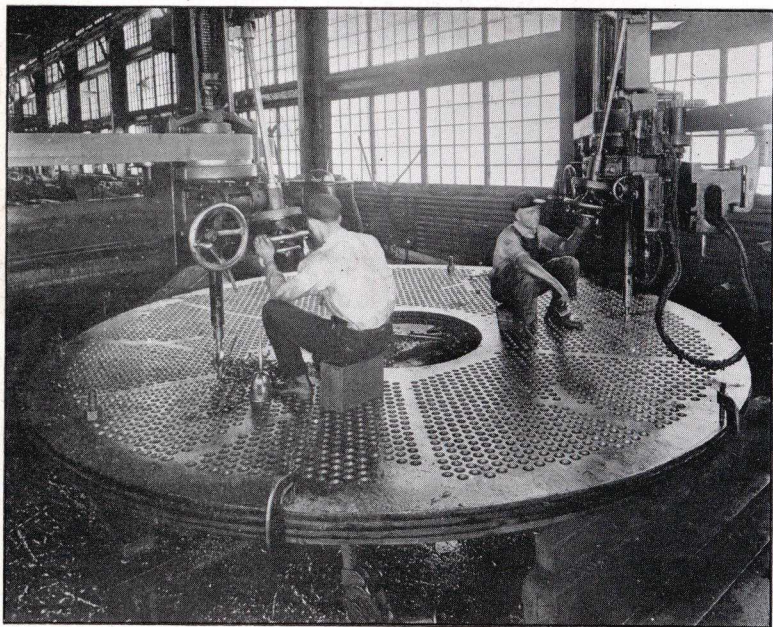
General Offices

AKRON, OHIO

July, 1917



An illustration of the performance of Whitman & Barnes "Hercules" High Speed Twist Drills and "W. & B. Diamond" High Speed Reamers in producing the greatest number of holes per grinding. Our customer was under contract to deliver Sugar Evaporators in Cuba on a specified date. They used "W. & B." Twist Drills and Reamers as they knew from experience they could be depended upon to produce holes in the shortest possible time at minimum cost.



Drilling and Reaming Sugar Evaporator Tube Sheets. Allegheny Iron 14 ft. diameter, 3102 holes drilled $1\frac{47}{64}$ in. through four plates each 1 inch thick with "W. & B." Hercules High Speed Twist Drills. Average production 15 holes per hour. Speed 130 R. P. M. Feed .010 inch per revolution. Holes reamed to $1\frac{49}{64}$ inch with "W. & B." No. 261 H. S. Rose Shell Reamers. Both operations proceeding at the same time.

Taper Shank Twist Drills



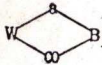
No. 102 Carbon Steel

No. 402 "Diamond" High Speed

Diam. Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.	Shank Taper	Diam. Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.	Shank Taper
	Carbon Steel	High Speed					Carbon Steel	High Speed			
1/16	\$0.45	\$0.90	4 3/8	1 1/4	No. 1	3/32	\$1.50	\$2.40	8 1/2	4 7/8	No. 2
5/64	.45	.90	4 1/2	1 3/8		1/16	1.50	2.40	8 1/2	4 7/8	
3/32	.45	.90	4 1/2	1 3/8		5/64	1.60	2.50	8 3/4	5 1/16	
7/64	.45	.90	4 5/8	1 9/16		3/32	1.60	2.50	8 3/4	5 1/16	
1/8	.45	.90	5 1/8	2 1/8		1/4	1.70	2.75	9	5 5/16	
9/64	.45	.90	5 1/4	2 1/4		5/32	1.70	2.75	9	5 5/16	
5/32	.45	.90	5 3/8	2 3/8		3/16	1.80	3.00	9 1/4	5 1/2	
11/64	.50	.90	5 3/4	2 11/16		1/4	1.80	3.00	9 1/4	5 1/2	
3/16	.50	.90	5 3/4	2 11/16		5/16	1.90	3.25	9 1/2	5 3/4	
13/64	.55	1.00	5 7/8	2 13/16		3/8	1.90	3.25	9 1/2	5 3/4	
7/32	.55	1.00	5 7/8	2 13/16		7/32	2.00	3.50	9 3/4	6	
15/64	.60	1.10	6 1/8	3		1/2	2.00	3.50	9 3/4	6	
1/4	.60	1.10	6 1/8	3		9/32	2.10	3.75	9 7/8	6 3/16	
11/64	.65	1.20	6 1/4	3 1/16		5/16	2.10	3.75	9 7/8	6 3/16	
3/32	.65	1.20	6 1/4	3 1/16		3/8	2.20	4.00	10	6 5/16	
13/64	.70	1.30	6 3/8	3 1/8		7/32	2.20	4.00	10	6 5/16	
5/16	.70	1.30	6 3/8	3 1/8		1/2	2.40	4.40	10 1/4	6 9/16	
21/64	.75	1.40	6 1/2	3 5/16		5/8	2.40	4.40	10 1/4	6 9/16	
11/32	.75	1.40	6 1/2	3 5/16		3/4	2.60	4.75	10 1/2	6 13/16	
23/64	.80	1.50	6 3/4	3 9/16		7/8	2.60	4.75	10 1/2	6 13/16	
3/8	.80	1.50	6 3/4	3 9/16		1	2.80	5.15	10 5/8	6 13/16	
25/64	.90	1.65	7	3 13/16		5/8	2.80	5.15	10 5/8	6 13/16	
13/32	.90	1.65	7	3 13/16		3/4					
7/16	1.00	1.75	7 1/4	4 1/16		1 1/4	3.00	5.50	10 3/4	6 1/4	
27/64	1.00	1.75	7 1/4	4 1/16		5/8	3.00	5.50	10 3/4	6 1/4	
15/32	1.10	1.90	7 1/2	4 3/8		3/4	3.25	5.90	10 7/8	6 3/8	
17/64	1.10	1.90	7 1/2	4 3/8		7/8	3.25	5.90	10 7/8	6 3/8	
31/64	1.20	2.00	7 3/4	4 5/8		1	3.50	6.25	11	6 1/2	
1 1/2	1.20	2.00	7 3/4	4 5/8		1 1/4	3.50	6.25	11	6 1/2	
33/64	1.30	2.15	8	4 7/8		1 1/2	3.75	6.75	11 1/8	6 5/8	
6 1/4	1.30	2.15	8	4 7/8		3/2	3.75	6.75	11 1/8	6 5/8	
35/64	1.40	2.25	8 1/4	5 1/8		1 3/4	4.00	7.25	11 1/4	6 3/4	
9/16	1.40	2.25	8 1/4	5 1/8	1 5/8	4.00	7.25	11 1/4	6 3/4		
					1 3/2	4.25	7.75	11 1/2	7		
					1 3/2	4.25	7.75	11 1/2	7		

Continued on next page

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Taper Shank Twist Drills



No. 102 Carbon Steel

No. 402 "Diamond" High Speed

Diam. Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.	Shank Taper	Diam. Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.	Shank Taper
	Carbon Steel	High Speed					Carbon Steel	High Speed			
1 7/64	\$4.50	\$8.25	11 3/4	7 1/4	No. 3	1 39/64	\$10.50	\$21.00	15 1/2	9 7/8	No. 4
1 11/8	4.50	8.25	11 3/4	7 1/4		1 15/8	10.50	21.00	15 1/2	9 7/8	
1 9/64	4.75	8 90	11 7/8	7 3/8		1 14 1/4	11 00	22.00	15 5/8	10	
1 5/32	4.75	8 90	11 7/8	7 3/8		1 21/32	11 00	22.00	15 5/8	10	
1 13/64	5.00	9 50	12	7 1/2		1 14 3/4	11.50	23.00	15 3/4	10 1/8	
1 13/64	5.00	9 50	12	7 1/2		1 11 1/6	11.50	23.00	15 3/4	10 1/8	
1 13/64	5.25	10 15	12 1/8	7 5/8		1 15 5/64	12.00	24.00	15 7/8	10 1/4	
1 7/32	5.25	10 15	12 1/8	7 5/8		1 23 3/32	12.00	24.00	15 7/8	10 1/4	
1 15/64	5.50	10 75	12 1/2	8		1 47 1/4	12.50	25.00	16	10 1/4	
1 1/4	5 50	10 75	12 1/2	8		1 3 3/4	12.50	25.00	16	10 1/4	
1 17/64	5.75	11 50	14 1/8	8 1/2		1 49 1/4	13.25	26.25	16 1/8	10 1/4	
1 9/32	5.75	11 50	14 1/8	8 1/2		1 25 5/32	13.25	26.25	16 1/8	10 1/4	
1 19/64	6.00	12 25	14 1/4	8 5/8		1 51 1/4	14.00	27.50	16 1/4	10 3/8	
1 5/16	6.00	12 25	14 1/4	8 5/8		1 13 1/3	14.00	27.50	16 1/4	10 3/8	
1 21/64	6.25	13.00	14 3/8	8 3/4	1 16 3/4	14.75	28.75	16 3/8	10 1/2		
1 11/32	6.25	13.00	14 3/8	8 3/4	1 32 1/2	14.75	28.75	16 3/8	10 1/2		
1 23/64	6.50	13 75	14 1/2	8 7/8	1 55 5/64	15 50	30.00	16 1/2	10 9/16		
1 3/8	6.50	13 75	14 1/2	8 7/8	1 7 7/8	15 50	30.00	16 1/2	10 9/16		
1 25/64	7.00	14.65	14 5/8	9	1 57 1/4	16 25	31.25	16 1/2	10 9/16		
1 13/32	7.00	14.65	14 5/8	9	1 29 1/32	16 25	31.25	16 1/2	10 9/16		
1 27/64	7 50	15 50	14 3/4	9 1/8	1 59 1/2	17 00	32.50	16 1/2	10 9/16		
1 7/16	7 50	15 50	14 3/4	9 1/8	1 16 1/2	17 00	32.50	16 1/2	10 9/16		
1 29/64	8 00	16 40	14 7/8	9 1/4	1 61 1/4	17 75	33 75	16 1/2	10 9/16		
1 15/32	8 00	16 40	14 7/8	9 1/4	1 32 1/2	17 75	33 75	16 1/2	10 9/16		
1 31/64	8 50	17 25	15	9 3/8	1 64	18 50	35 00	16 1/2	10 9/16		
1 1/2	8 50	17 25	15	9 3/8	2	18 50	35 00	16 1/2	10 9/16		
1 33/64	9 00	18 15	15 1/8	9 1/2	2 1/64	19 25	36 25	16 1/2	9 1/2		
1 17/32	9 00	18 15	15 1/8	9 1/2	2 3/32	19 25	36 25	16 1/2	9 1/2		
1 35/64	9 50	19 00	15 1/4	9 5/8	2 2/64	20 00	37 50	17	10 1/16		
1 9/16	9 50	19 00	15 1/4	9 5/8	2 1/16	20 00	37 50	17	10 1/16		
1 7/8	10 00	20 00	15 3/8	9 3/4	2 5/64	20 75	38 75	17	10 1/16		
1 3/2	10 00	20 00	15 3/8	9 3/4	2 3/32	20 75	38 75	17	10 1/16		

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ALWAYS GIVE LIST NUMBER WHEN ORDERING

Taper Shank Twist Drills

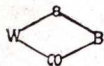


No. 102 Carbon Steel
No. 402 "Diamond" High Speed

Diam. Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.	Shank Taper	Diam. Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.	Shank Taper
	Carbon Steel	High Speed					Carbon Steel	High Speed			
2 7/64	\$21.50	\$40.00	17	10 1/16	No. 5	2 45/64	\$37.00	\$82.50	20 1/2	13 1/4	No. 5
2 1/8	21.50	40.00	17	10 1/16		2 23/32	37.00	82.50	20 1/2	13 1/4	
2 9/64	22.25	41.25	17	10 1/16		2 49/64	38.00	85.00	20 1/2	13 1/4	
2 5/32	22.25	41.25	17	10 1/16		2 31/4	38.00	85.00	20 1/2	13 1/4	
2 11/64	23.00	42.50	17	10 1/16		2 49/64	39.25	87.50	20 1/2	13 1/4	
2 3/16	23.00	42.50	17	10 1/16		2 25/32	39.25	87.50	20 1/2	13 1/4	
2 13/64	23.75	43.75	17 1/2	10 1/16		2 51/64	40.50	90.00	20 1/2	13 1/4	
2 7/32	23.75	43.75	17 1/2	10 1/16		2 13/16	40.50	90.00	20 1/2	13 1/4	
2 15/64	24.50	45.00	17 1/2	10 1/16		2 53/64	41.75	92.50	21	13 3/4	
2 1/4	24.50	45.00	17 1/2	10 9/16		2 27/32	41.75	92.50	21	13 3/4	
2 17/64	25.25	47.50	17 1/2	10 9/16		2 31/32	43.00	95.00	21	13 3/4	
2 9/32	25.25	47.50	17 1/2	10 9/16		2 25/32	43.00	95.00	21	13 3/4	
2 19/64	26.00	50.00	17 1/2	10 9/16		2 7/8	44.25	97.50	21	13 3/4	
2 5/16	26.00	50.00	17 1/2	10 9/16		2 51/4	44.25	97.50	21	13 3/4	
2 21/64	26.75	52.50	18	10 7/8		2 29/32	44.25	97.50	21	13 3/4	
2 11/32	26.75	52.50	18	10 7/8		2 59/64	45.50	100.00	21	13 3/4	
2 23/64	27.50	55.00	18	10 7/8		2 15/16	45.50	100.00	21	13 3/4	
2 3/8	27.50	55.00	18	10 7/8		2 61/64	46.75	102.50	22	14 5/8	
2 25/64	28.25	57.50	18 1/2	11 3/8		2 31/32	46.75	102.50	22	14 5/8	
2 13/32	28.25	57.50	18 1/2	11 3/8		2 53/64	48.00	105.00	22	14 5/8	
2 27/64	29.00	60.00	18 1/2	11 3/8		3	48.00	105.00	22	14 5/8	
2 7/16	29.00	60.00	18 1/2	11 3/8		3	48.00	105.00	22	14 5/8	
2 29/64	29.75	62.50	19	11 7/8		3 1/16	52.00	112.50	22	12 1/2	
2 15/32	29.75	62.50	19	11 7/8		3 1/8	56.00	120.00	22	12 1/2	
2 31/64	30.50	65.00	19	11 7/8		3 3/16	60.00	127.50	22	12 1/2	
2 1/2	30.50	65.00	19	11 7/8		3 1/4	65.00	135.00	23	13 1/2	
2 33/64	31.25	67.50	19 1/4	12 1/8		3 5/16	70.00	142.50	23	13 1/2	
2 17/32	31.25	67.50	19 1/4	12 1/8		3 3/8	75.00	150.00	23	13 1/2	
2 35/64	32.00	70.00	19 1/4	12 1/8		3 7/16	80.00	157.50	23	13 1/2	
2 9/16	32.00	70.00	19 1/4	12 1/8		3 1/2	85.00	165.00	24	14 3/8	
2 37/64	33.00	72.50	19 1/2	12 3/8		3 9/16	91.00	172.50	24	14 3/8	
2 19/32	33.00	72.50	19 1/2	12 3/8		3 5/8	98.00	180.00	24	14 3/8	
2 39/64	34.00	75.00	19 1/2	12 3/8		3 11/16	105.00	187.50	24	14 3/8	
2 5/8	34.00	75.00	19 1/2	12 3/8	3 3/4	112.00	195.00	24	14 3/8		
2 41/64	35.00	77.50	20	12 7/8	3 13/16	119.00	202.50	24	14 3/8		
2 21/32	35.00	77.50	20	12 7/8	3 7/8	126.00	210.00	24	14 3/8		
2 43/64	36.00	80.00	20	12 7/8	3 15/16	133.00	217.50	24	14 3/8		
2 11/16	36.00	80.00	20	12 7/8	4	140.00	225.00	25	15 1/8		

Thirty-second sizes not listed take list midway between sixteenth sizes. (Continued on next page)
Sixty-fourth sizes furnished at list of the next larger size.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Taper Shank Twist Drills



No. 102 Carbon Steel

Diam. Ins.	Price Each Carbon Steel	Length Over All Ins.	Length of Twist Ins.	Shank Taper
$4\frac{1}{16}$	\$147.50	25	$15\frac{1}{8}$	No. 6
$4\frac{1}{8}$	155.00	25	$15\frac{1}{8}$	
$4\frac{3}{16}$	162.00	25	$15\frac{3}{16}$	
$4\frac{1}{4}$	170.00	25	$15\frac{3}{16}$	
$4\frac{5}{16}$	177.50	25	$15\frac{3}{16}$	
$4\frac{3}{8}$	185.00	25	$15\frac{1}{4}$	
$4\frac{7}{16}$	192.50	25	$15\frac{1}{4}$	
$4\frac{1}{2}$	200.00	26	$16\frac{1}{8}$	
$4\frac{9}{16}$	207.50	26	$16\frac{1}{8}$	
$4\frac{5}{8}$	215.00	26	$16\frac{1}{8}$	
$4\frac{11}{16}$	222.50	26	$16\frac{3}{16}$	
$4\frac{3}{4}$	230.00	26	$16\frac{3}{16}$	
$4\frac{13}{16}$	237.50	26	$16\frac{3}{16}$	
$4\frac{7}{8}$	245.00	26	$16\frac{1}{4}$	
$4\frac{15}{16}$	252.50	26	$16\frac{1}{4}$	
5	260.00	27	$17\frac{1}{8}$	
$5\frac{1}{8}$	275.00	27	$17\frac{1}{8}$	
$5\frac{1}{4}$	290.00	27	$17\frac{3}{16}$	
$5\frac{3}{8}$	305.00	27	$17\frac{3}{16}$	
$5\frac{1}{2}$	325.00	28	18	
$5\frac{5}{8}$	340.00	28	18	
$5\frac{3}{4}$	360.00	28	18	
$5\frac{7}{8}$	380.00	28	18	
6	400.00	28	18	

Thirty-second sizes not listed take list midway between sixteenth sizes.

Sixty-fourth sizes furnished at list of the next larger size.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

Taper Shank Twist Drills

SHANKS LARGER THAN REGULAR



No. 102 Special, Carbon Steel

No. 402 Special, "Diamond" High Speed

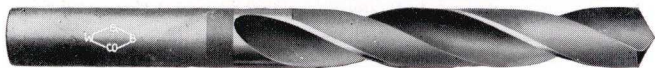
Diam. Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.	Shank Taper	Diam. Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.	Shank Taper
	Carbon Steel	High Speed					Carbon Steel	High Speed			
5/16	\$1.40	\$2.80	6 1/2	2 3/4	No. 2	27/32	\$3.10	\$5.45	10 3/8	5 1/8	No. 3
5/16	1.40	2.80	6 3/4	3		29/32	3.20	5.60	10 1/2	5 1/8	
5/16	1.40	2.80	6 3/4	3		31/32	3.20	5.60	10 1/2	5 1/8	
5/16	1.40	2.80	7	3 1/4		1/8	3.30	5.75	10 5/8	6 1/8	
5/16	1.40	2.80	7	3 1/4		1/8	3.30	5.75	10 5/8	6 1/8	
5/16	1.40	2.80	7 1/4	3 1/2		1/8	5.40	10.50	12	6 1/4	
5/16	1.40	2.80	7 1/4	3 1/2		1/8	5.40	10.50	12	6 1/4	
5/16	1.40	2.80	7 1/2	3 3/4		1/8	5.60	10.80	12 1/4	6 1/2	
5/16	1.40	2.80	7 1/2	3 3/4		1/8	5.60	10.80	12 1/4	6 1/2	
5/16	1.45	3.00	7 3/4	4		1/8	5.60	10.80	12 1/4	6 1/2	
5/16	1.45	3.00	7 3/4	4		1/8	5.80	11.10	12 1/2	6 3/4	
5/16	1.50	3.00	8	4 1/4		1/8	5.80	11.10	12 1/2	6 3/4	
5/16	1.50	3.00	8	4 1/4		1/8	6.00	11.55	12 3/4	7	
5/16	1.60	3.20	8 1/4	4 7/16		1/8	6.00	11.55	12 3/4	7	
5/16	1.60	3.20	8 1/4	4 7/16		1/8	6.20	12.00	13	7 1/4	
5/16	1.70	3.20	8 1/2	4 11/16		1/8	6.20	12.00	13	7 1/4	
5/16	1.70	3.20	8 1/2	4 11/16	1/8	13.25	25.00	16 1/2	9 1/2		
3/8	2.50	4.60	9 3/8	4 13/16	No. 3	13 3/4	13.25	25.00	16 1/2	9 1/2	
3/8	2.50	4.60	9 3/8	4 13/16		14 9/16	14.00	26.25	16 1/2	9 1/2	
3/8	2.50	4.60	9 1/2	4 15/16		14 5/8	14.00	26.25	16 1/2	9 1/2	
3/8	2.50	4.60	9 1/2	4 15/16		14 7/8	14.75	27.50	16 1/2	9 1/2	
3/8	2.50	4.60	9 5/8	5 1/16		14 7/8	14.75	27.50	16 1/2	9 1/2	
3/8	2.50	4.60	9 5/8	5 1/16		15 1/8	15.50	28.75	16 1/2	9 1/2	
3/8	2.60	4.60	9 3/4	5 3/16		15 3/8	15.50	28.75	16 1/2	9 1/2	
3/8	2.60	4.60	9 3/4	5 3/16		15 5/8	16.25	30.00	16 1/2	9 1/2	
3/8	2.70	5.00	9 7/8	5 5/16		15 7/8	16.25	30.00	16 1/2	9 1/2	
3/8	2.70	5.00	9 7/8	5 5/16		16 1/8	17.00	31.25	16 1/2	9 1/2	
3/8	2.80	5.00	10	5 7/16		16 3/8	17.00	31.25	16 1/2	9 1/2	
3/8	2.80	5.00	10	5 7/16		16 5/8	17.75	32.50	16 1/2	9 1/2	
3/8	2.90	5.00	10 1/8	5 9/16		16 7/8	17.75	32.50	16 1/2	9 1/2	
3/8	2.90	5.00	10 1/8	5 9/16		16 9/8	18.50	33.75	16 1/2	9 1/2	
3/8	3.00	5.45	10 1/4	5 11/16		16 5/4	18.50	33.75	16 1/2	9 1/2	
3/8	3.00	5.45	10 1/4	5 11/16		16 3/2	19.25	35.00	16 1/2	9 1/2	
3/8	3.10	5.45	10 3/8	5 13/16	2	19.25	35.00	16 1/2	9 1/2		

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Straight Shank Twist Drills

TAPER LENGTH



No. 104 Carbon Steel

No. 404 "Diamond" High Speed

Diam. Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.	Diam. Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.
	Carbon Steel	High Speed				Carbon Steel	High Speed		
1/16	\$0.45	\$0.90	3 5/8	1 1/2	1 3/2	\$1.50	\$2.40	8 1/2	5 5/8
5/64	.45	.90	4	1 5/8	3 3/2	1.60	2.50	8 3/4	5 3/4
3/32	.45	.90	4 3/8	1 7/8	6 4/8	1.60	2.50	8 3/4	5 3/4
7/64	.45	.90	4 3/4	2 1/4	5 5/8	1.70	2.75	9	5 7/8
1/8	.45	.90	5 1/8	2 5/8	11	1.70	2.75	9	5 7/8
9/64	.45	.90	5 3/8	3	6 4/4	1.80	3.00	9 1/4	6
5/32	.45	.90	5 3/8	3	6 4/4	1.80	3.00	9 1/4	6
11/64	.50	.90	5 3/4	3 1/2	11 1/6	1.90	3.25	9 1/2	6 3/16
3/16	.50	.90	5 3/4	3 1/2	14 5/8	1.90	3.25	9 1/2	6 3/16
13/64	.55	1.00	6	4	6 4/4	2.00	3.50	9 3/4	6 3/8
7/32	.55	1.00	6	4	3 2/2	2.00	3.50	9 3/4	6 3/8
15/64	.60	1.10	6 1/8	4 1/8	4 4/4	2.10	3.75	9 7/8	6 1/2
6 1/4	.60	1.10	6 1/8	4 1/8	6 4/4	2.10	3.75	9 7/8	6 1/2
17/64	.65	1.20	6 1/4	4 1/8	3 2/2	2.20	4.00	10	6 5/8
9/32	.65	1.20	6 1/4	4 1/8	6 4/4	2.20	4.00	10	6 5/8
19/64	.70	1.30	6 3/8	4 1/8	13	2.40	4.40	10 1/4	6 3/4
5/16	.70	1.30	6 3/8	4 1/8	16 3/8	2.40	4.40	10 1/4	6 3/4
11/32	.75	1.40	6 1/2	4 1/4	5 6/4	2.60	4.75	10 1/2	7
13/32	.75	1.40	6 1/2	4 1/4	2 7/2	2.60	4.75	10 1/2	7
3/8	.80	1.50	6 3/4	4 1/4	3 5/4	2.80	5.15	10 5/8	7
25/64	.80	1.50	6 3/4	4 1/4	5 4/4	2.80	5.15	10 5/8	7
13/32	.90	1.65	7	4 3/8	3 2/2	3.00	5.50	10 3/4	7
27/64	.90	1.65	7	4 3/8	6 4/4	3.00	5.50	10 3/4	7
7/16	1.00	1.75	7 1/4	4 5/8	15	3.00	5.50	10 3/4	7
29/64	1.00	1.75	7 1/4	4 5/8	6 1/4	3.25	5.90	10 7/8	7 1/8
15/32	1.10	1.90	7 1/2	4 7/8	6 4/4	3.25	5.90	10 7/8	7 1/8
31/64	1.10	1.90	7 1/2	4 7/8	3 2/2	3.50	6.25	11	7 3/8
1 1/2	1.20	2.00	7 3/4	5	5 4/4	3.50	6.25	11	7 3/8
33/64	1.20	2.00	7 3/4	5	7 7/8	3.75	6.75	11 1/8	7 5/16
1 1/2	1.30	2.15	8	5 1/4	3 2/2	3.75	6.75	11 1/8	7 5/16
17/32	1.30	2.15	8	5 1/4	1 1/4	4.00	7.25	11 1/4	7 3/8
35/64	1.40	2.25	8 1/4	5 3/8	1 1/6	4.00	7.25	11 1/4	7 3/8
9/16	1.40	2.25	8 1/4	5 3/8	1 5/16	4.25	7.75	11 1/2	7 5/8
1 1/4	1.40	2.25	8 1/4	5 3/8	1 3/4	4.25	7.75	11 1/2	7 5/8
37/64	1.50	2.40	8 1/2	5 5/8	1 3/2	4.50	8.25	11 3/4	7 7/8

Continued on next page

ALWAYS GIVE LIST NUMBER WHEN ORDERING

Straight Shank Twist Drills

TAPER LENGTH



No. 104 Carbon Steel

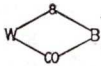
No. 404 "Diamond" High Speed

Diam. Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.	Diam. Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.
	Carbon Steel	High Speed				Carbon Steel	High Speed		
1 1/8	\$4.50	\$8.25	11 3/4	7 7/8	1 2 1/2	\$11.00	\$22.00	15 5/8	10 1/2
1 9/64	4.75	8.90	11 7/8	8	1 4 3/64	11.50	23.00	15 3/4	10 5/8
1 5/32	4.75	8.90	11 7/8	8	1 1 1/16	11.50	23.00	15 3/4	10 5/8
1 1/4	5.00	9.50	12	8 1/8	1 4 5/64	12.00	24.00	15 7/8	10 3/4
1 3/16	5.00	9.50	12	8 1/8	1 2 3/32	12.00	24.00	15 7/8	10 3/4
1 5/16	5.25	10.15	12 1/8	8 1/8	1 3 1/64	12.50	25.00	16	10 7/8
1 7/32	5.25	10.15	12 1/8	8 1/8	1 5 1/64	12.50	25.00	16	10 7/8
1 1/2	5.50	10.75	12 1/2	8 1/2	1 4 9/64	13.25	26.25	16 1/8	10 1/8
1 1/4	5.50	10.75	12 1/2	8 1/2	1 2 5/32	13.25	26.25	16 1/8	10 1/8
1 3/4	5.75	11.50	14 1/8	9 1/8	1 5 1/64	14.00	27.50	16 1/4	10 1/4
1 9/32	5.75	11.50	14 1/8	9 1/8	1 1 3/16	14.00	27.50	16 1/4	10 1/4
1 1/2	6.00	12.25	14 1/4	9 1/4	1 6 3/64	14.75	28.75	16 3/8	10 5/8
1 5/16	6.00	12.25	14 1/4	9 1/4	1 2 7/32	14.75	28.75	16 3/8	10 5/8
1 1/4	6.25	13.00	14 3/8	9 3/8	1 3 2/64	15.50	30.00	16 1/2	10 1/2
1 11/32	6.25	13.00	14 3/8	9 3/8	1 7 1/8	15.50	30.00	16 1/2	10 1/2
1 3/4	6.50	13.75	14 1/2	9 1/2	1 5 7/64	16.25	31.25	16 1/2	10 1/2
1 3/8	6.50	13.75	14 1/2	9 1/2	1 2 9/32	16.25	31.25	16 1/2	10 1/2
1 2 5/8	7.00	14.65	14 5/8	9 1/2	1 5 9/64	17.00	32.50	16 1/2	10 1/2
1 13/32	7.00	14.65	14 5/8	9 1/2	1 1 5/16	17.00	32.50	16 1/2	10 1/2
1 1/2	7.50	15.50	14 3/4	9 5/8	1 6 1/64	17.75	33.75	16 1/2	10 1/2
1 7/16	7.50	15.50	14 3/4	9 5/8	1 3 1/32	17.75	33.75	16 1/2	10 1/2
1 1/2	8.00	16.40	14 7/8	9 3/4	1 3 1/32	18.50	35.00	16 1/2	10 1/2
1 1 1/2	8.00	16.40	14 7/8	9 3/4	1 6 3/4	18.50	35.00	16 1/2	10 1/2
1 1 1/2	8.50	17.25	15	9 7/8	2	18.50	35.00	16 1/2	10 1/2
1 1 1/2	8.50	17.25	15	9 7/8	2 1/64	19.25	36.25	16 1/2	9 7/8
1 3/4	9.00	18.15	15 1/8	10	2 1/32	19.25	36.25	16 1/2	9 7/8
1 1 1/2	9.00	18.15	15 1/8	10	2 3/64	20.00	37.50	17	10 3/8
1 1 1/2	9.50	19.00	15 1/4	10 1/8	2 1/16	20.00	37.50	17	10 3/8
1 3 5/64	9.50	19.00	15 1/4	10 1/8	2 5/64	20.75	38.75	17	10 3/8
1 9/16	9.50	19.00	15 1/4	10 1/8	2 3/32	20.75	38.75	17	10 3/8
1 1 1/2	10.00	20.00	15 3/8	10 1/4	2 7/64	21.50	40.00	17	10 3/8
1 1 1/2	10.00	20.00	15 3/8	10 1/4	2 1/8	21.50	40.00	17	10 3/8
1 3 9/64	10.50	21.00	15 1/2	10 3/8	2 5/64	22.25	41.25	17	10 3/8
1 5/8	10.50	21.00	15 1/2	10 3/8	2 5/32	22.25	41.25	17	10 3/8
1 1 1/2	11.00	22.00	15 5/8	10 1/2	2 1/64	23.00	42.50	17	10 3/8

Drills 1 5/8 in. to 3 in. have shank 1 3/4 in. in diameter by 6 in. long.

Continued on next page

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Straight Shank Twist Drills

TAPER LENGTH



No. 104 Carbon Steel

No. 404 "Diamond" High Speed

Diam. Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.	Diam. Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.
	Carbon Steel	High Speed				Carbon Steel	High Speed		
2 ³ / ₁₆	\$23.00	\$42.50	17	10 ³ / ₈	2 ⁴ / ₇	\$38.00	\$85.00	20 ¹ / ₂	13 ⁷ / ₈
2 ¹³ / ₆₄	23.75	43.75	17 ¹ / ₂	10 ⁷ / ₈	2 ³ / ₄	38.00	85.00	20 ¹ / ₂	13 ⁷ / ₈
2 ⁷ / ₃₂	23.75	43.75	17 ¹ / ₂	10 ⁷ / ₈	2 ⁴ / ₉	39.25	87.50	20 ¹ / ₂	13 ⁷ / ₈
2 ¹⁵ / ₆₄	24.50	45.00	17 ¹ / ₂	10 ⁷ / ₈	2 ⁵ / ₄	39.25	87.50	20 ¹ / ₂	13 ⁷ / ₈
2 ¹ / ₄	24.50	45.00	17 ¹ / ₂	10 ⁷ / ₈	2 ⁵ / ₂	40.50	90.00	20 ¹ / ₂	13 ⁷ / ₈
2 ¹⁷ / ₆₄	25.25	47.50	17 ¹ / ₂	10 ⁷ / ₈	2 ⁵ / ₄	40.50	90.00	20 ¹ / ₂	13 ⁷ / ₈
2 ⁹ / ₃₂	25.25	47.50	17 ¹ / ₂	10 ⁷ / ₈	2 ¹ / ₆	41.75	92.50	21	14 ³ / ₈
2 ¹⁹ / ₆₄	26.00	50.00	17 ¹ / ₂	10 ⁷ / ₈	2 ⁵ / ₃	41.75	92.50	21	14 ³ / ₈
2 ⁵ / ₁₆	26.00	50.00	17 ¹ / ₂	10 ⁷ / ₈	2 ⁵ / ₂	43.00	95.00	21	14 ³ / ₈
2 ²¹ / ₆₄	26.75	52.50	18	11 ³ / ₈	2 ⁶ / ₄	43.00	95.00	21	14 ³ / ₈
2 ¹¹ / ₃₂	26.75	52.50	18	11 ³ / ₈	2 ⁷ / ₈	44.25	97.50	21	14 ³ / ₈
2 ³ / ₈	27.50	55.00	18	11 ³ / ₈	2 ⁵ / ₇	44.25	97.50	21	14 ³ / ₈
2 ³ / ₈	27.50	55.00	18	11 ³ / ₈	2 ³ / ₂	44.25	97.50	21	14 ³ / ₈
2 ²³ / ₆₄	28.25	57.50	18 ¹ / ₂	11 ⁷ / ₈	2 ⁵ / ₉	45.50	100.00	21	14 ³ / ₈
2 ¹³ / ₃₂	28.25	57.50	18 ¹ / ₂	11 ⁷ / ₈	2 ¹ / ₆	45.50	100.00	21	14 ³ / ₈
2 ⁷ / ₁₆	29.00	60.00	18 ¹ / ₂	11 ⁷ / ₈	2 ⁶ / ₄	46.75	102.50	22	15 ³ / ₈
2 ⁷ / ₁₆	29.00	60.00	18 ¹ / ₂	11 ⁷ / ₈	2 ⁶ / ₄	46.75	102.50	22	15 ³ / ₈
2 ¹⁹ / ₆₄	29.75	62.50	19	12 ³ / ₈	2 ³ / ₂	48.00	105.00	22	15 ³ / ₈
2 ¹⁵ / ₃₂	29.75	62.50	19	12 ³ / ₈	2 ⁶ / ₄	48.00	105.00	22	15 ³ / ₈
2 ³¹ / ₆₄	30.50	65.00	19	12 ³ / ₈	3	52.00	112.50	22	15 ³ / ₈
2 ¹ / ₂	30.50	65.00	19	12 ³ / ₈	3 ¹ / ₁₆	56.00	120.00	22	15 ³ / ₈
2 ³³ / ₆₄	31.25	67.50	19 ¹ / ₄	12 ⁵ / ₈	3 ¹ / ₈	60.00	127.50	22	15 ³ / ₈
2 ¹ / ₄	31.25	67.50	19 ¹ / ₄	12 ⁵ / ₈	3 ³ / ₁₆	65.00	135.00	23	16 ¹ / ₄
2 ¹ / ₄	31.25	67.50	19 ¹ / ₄	12 ⁵ / ₈	3 ¹ / ₄	70.00	142.50	23	16 ¹ / ₄
2 ³⁵ / ₆₄	32.00	70.00	19 ¹ / ₄	12 ⁵ / ₈	3 ⁵ / ₁₆	75.00	150.00	23	16 ¹ / ₄
2 ⁹ / ₁₆	32.00	70.00	19 ¹ / ₄	12 ⁵ / ₈	3 ³ / ₈	75.00	150.00	23	16 ¹ / ₄
2 ³⁷ / ₆₄	33.00	72.50	19 ¹ / ₂	12 ⁷ / ₈	3 ⁷ / ₁₆	80.00	157.50	23	16 ¹ / ₄
2 ¹ / ₂	33.00	72.50	19 ¹ / ₂	12 ⁷ / ₈	3 ¹ / ₂	85.00	165.00	24	17 ¹ / ₈
2 ¹ / ₂	33.00	72.50	19 ¹ / ₂	12 ⁷ / ₈	3 ¹ / ₂	91.00	172.50	24	17 ¹ / ₈
2 ³⁹ / ₆₄	34.00	75.00	19 ¹ / ₂	12 ⁷ / ₈	3 ⁵ / ₈	98.00	180.00	24	17 ¹ / ₈
2 ⁷ / ₈	34.00	75.00	19 ¹ / ₂	12 ⁷ / ₈	3 ⁵ / ₈	98.00	180.00	24	17 ¹ / ₈
2 ⁴¹ / ₆₄	35.00	77.50	20	13 ³ / ₈	3 ¹ / ₁₆	105.00	187.50	24	17 ¹ / ₈
2 ³ / ₂	35.00	77.50	20	13 ³ / ₈	3 ³ / ₈	112.00	195.00	24	17 ¹ / ₈
2 ⁴³ / ₆₄	36.00	80.00	20	13 ³ / ₈	3 ¹ / ₆	119.00	202.50	24	17 ¹ / ₈
2 ¹ / ₁	36.00	80.00	20	13 ³ / ₈	3 ¹ / ₆	126.00	210.00	24	17 ¹ / ₈
2 ⁴⁵ / ₆₄	37.00	82.50	20 ¹ / ₂	13 ⁷ / ₈	3 ¹ / ₆	133.00	217.50	24	17 ¹ / ₈
2 ³ / ₂	37.00	82.50	20 ¹ / ₂	13 ⁷ / ₈	4	140.00	225.00	25	18 ¹ / ₈

Drills 1 ³/₄ in. to 3 in. have shanks 1 ³/₄ in. diameter by 6 inches long.
 Drills 3 ³/₄ in. to 4 in. have shanks 2 in. diameter by 6 in. long.
 Thirty-second sizes not listed take list midway between sixteenth sizes.
 Sixty-fourth sizes furnished at list of the next larger size.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Straight Shank Twist Drills

JOBBER'S LENGTH



No. 105 Carbon Steel

No. 405 "Diamond" High Speed

Diam. Ins.	PRICE PER DOZEN		Length Over All Ins.	Length of Twist Ins.
	Carbon Steel	High Speed		
$\frac{1}{32}$	\$1.50	.....	$1\frac{7}{16}$	$\frac{9}{16}$
$\frac{3}{64}$	1.55	.....	$1\frac{1}{16}$	$\frac{3}{8}$
$\frac{1}{16}$	1.60	\$5.70	$2\frac{1}{2}$	$1\frac{1}{4}$
$\frac{5}{64}$	1.65	5.70	$2\frac{5}{8}$	$1\frac{3}{8}$
$\frac{3}{32}$	1.70	5.70	$2\frac{3}{4}$	$1\frac{1}{2}$
$\frac{7}{64}$	1.75	5.90	$2\frac{7}{8}$	$1\frac{1}{16}$
$1\frac{1}{8}$	1.80	5.90	3	$1\frac{13}{16}$
$\frac{9}{64}$	1.85	6.10	$3\frac{1}{8}$	$1\frac{1}{16}$
$\frac{5}{32}$	1.90	6.10	$3\frac{1}{4}$	$2\frac{3}{32}$
$\frac{11}{64}$	2.00	6.30	$3\frac{3}{8}$	$2\frac{7}{32}$
$\frac{3}{16}$	2.25	6.30	$3\frac{1}{2}$	$2\frac{5}{16}$
$\frac{13}{64}$	2.50	7.00	$3\frac{5}{8}$	$2\frac{7}{16}$
$\frac{7}{32}$	2.75	7.00	$3\frac{3}{4}$	$2\frac{17}{32}$
$\frac{15}{64}$	3.00	7.35	$3\frac{7}{8}$	$2\frac{21}{32}$
$1\frac{1}{4}$	3.25	7.35	4	$2\frac{3}{4}$
$\frac{17}{64}$	3.50	9.10	$4\frac{1}{8}$	$2\frac{7}{8}$
$\frac{9}{32}$	3.80	9.10	$4\frac{1}{4}$	$2\frac{31}{32}$
$\frac{19}{64}$	4.00	10.50	$4\frac{3}{8}$	$3\frac{3}{32}$
$\frac{5}{16}$	4.35	10.50	$4\frac{1}{2}$	$3\frac{3}{16}$
$\frac{21}{64}$	4.70	12.00	$4\frac{5}{8}$	$3\frac{5}{16}$
$\frac{11}{32}$	5.05	12.00	$4\frac{3}{4}$	$3\frac{13}{32}$
$\frac{23}{64}$	5.50	13.50	$4\frac{7}{8}$	$3\frac{17}{32}$
$\frac{3}{8}$	6.00	13.50	5	$3\frac{3}{2}$
$\frac{25}{64}$	6.50	15.00	$5\frac{1}{8}$	$3\frac{5}{8}$
$\frac{13}{32}$	7.00	15.00	$5\frac{1}{4}$	$3\frac{27}{32}$
$\frac{27}{64}$	7.75	17.00	$5\frac{3}{8}$	$3\frac{31}{32}$
$\frac{7}{16}$	8.50	17.00	$5\frac{1}{2}$	$4\frac{1}{16}$
$\frac{29}{64}$	9.25	18.75	$5\frac{5}{8}$	$4\frac{3}{16}$
$\frac{15}{32}$	10.00	18.75	$5\frac{3}{4}$	$4\frac{9}{32}$
$\frac{31}{64}$	11.00	20.00	$5\frac{7}{8}$	$4\frac{13}{32}$
$1\frac{1}{2}$	12.00	20.00	6	$4\frac{1}{2}$

These drills in $\frac{3}{16}$ -in. diameter are adapted for STAYBOLT DRILL-ING.

Packed: Sizes $\frac{1}{32}$ to $\frac{9}{32}$ in., one dozen; $\frac{19}{64}$ to $\frac{11}{32}$ in., four dozen; $\frac{23}{32}$ to $\frac{25}{64}$ in., three dozen; $\frac{15}{32}$ to $\frac{17}{32}$ in., two dozen; and $\frac{31}{64}$ to $\frac{1}{2}$ in., one dozen of a size in a package.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Letter Size Twist Drills



No. 106 Carbon Steel

No. 406 "Diamond" High Speed

Diameter Ins.	PRICE PER DOZEN		Decimal Diameter Ins.	Length Over All Ins.	Length of Twist Ins.
	Carbon Steel	High Speed			
A	\$3.00	\$ 7.35	.234	$3\frac{13}{16}$	$2\frac{19}{32}$
B	3.05	7.35	.238	$3\frac{13}{16}$	$2\frac{19}{32}$
C	3.10	7.35	.242	$3\frac{13}{16}$	$2\frac{19}{32}$
D	3.15	7.35	.246	$3\frac{13}{16}$	$2\frac{19}{32}$
E	3.25	7.35	.250	$3\frac{13}{16}$	$2\frac{19}{32}$
F	3.35	9.10	.257	$4\frac{1}{4}$	3
G	3.45	9.10	.261	$4\frac{1}{4}$	3
H	3.55	9.10	.266	$4\frac{1}{4}$	3
I	3.65	9.10	.272	$4\frac{1}{4}$	3
J	3.70	9.10	.277	$4\frac{1}{4}$	3
K	3.80	9.10	.281	$4\frac{1}{4}$	3
L	3.90	10.50	.290	$4\frac{1}{4}$	$2\frac{31}{32}$
M	4.00	10.50	.295	$4\frac{1}{4}$	$2\frac{31}{32}$
N	4.25	10.50	.302	$4\frac{1}{4}$	$2\frac{31}{32}$
O	4.40	10.50	.316	$4\frac{1}{4}$	$2\frac{31}{32}$
P	4.60	12.00	.323	$4\frac{5}{8}$	$3\frac{5}{16}$
Q	4.75	12.00	.332	$4\frac{3}{4}$	$3\frac{5}{8}$
R	5.00	12.00	.339	$4\frac{3}{4}$	$3\frac{7}{16}$
S	5.15	13.50	.348	$4\frac{7}{8}$	$3\frac{1}{2}$
T	5.30	13.50	.358	$4\frac{7}{8}$	$3\frac{1}{2}$
U	5.50	13.50	.368	5	$3\frac{5}{8}$
V	6.00	13.50	.377	5	$3\frac{5}{8}$
W	6.50	15.00	.386	$5\frac{1}{8}$	$3\frac{3}{4}$
X	6.75	15.00	.397	$5\frac{1}{4}$	$3\frac{7}{8}$
Y	7.00	15.00	.404	$5\frac{1}{4}$	$3\frac{7}{8}$
Z	7.25	17.00	.413	$5\frac{3}{8}$	$3\frac{31}{32}$

Decimal equivalent to fractional inches see pages 90, 91 and 92.

Packed: Sizes "L" and smaller, one dozen; "M" to "R," four dozen; "S" to "W," three dozen; "X" to "Z," two dozen of a size in a package.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

Wire Gauge Twist Drills



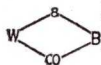
No. 107 Carbon Steel
No. 407 "Diamond" High Speed

Wire Gauge No.	PRICE PER DOZ.		Decimal Diameter Ins.	Length Over All Ins.	Length Twist Ins.	Wire Gauge No.	PRICE PER DOZ.		Decimal Diameter Ins.	Length Over All Ins.	Length Twist Ins.
	Carbon Steel	High Speed					Carbon Steel	High Speed			
1	\$2.75	\$7.00	.2280	4	2 $\frac{1}{32}$	31	\$1.75	\$5.90	.1200	2 $\frac{3}{4}$	1 $\frac{1}{16}$
2	2.75	7.00	.2210	3 $\frac{1}{16}$	2 $\frac{7}{8}$	32	1.75	5.90	.1160	2 $\frac{1}{8}$	1 $\frac{5}{8}$
3	2.75	7.00	.2130	3 $\frac{1}{16}$	2 $\frac{5}{8}$	33	1.75	5.90	.1130	2 $\frac{1}{16}$	1 $\frac{5}{8}$
4	2.75	7.00	.2090	3 $\frac{7}{8}$	2 $\frac{1}{2}$	34	1.75	5.90	.1110	2 $\frac{1}{8}$	1 $\frac{9}{16}$
5	2.75	7.00	.2055	3 $\frac{1}{16}$	2 $\frac{9}{16}$	35	1.75	5.90	.1100	2 $\frac{9}{16}$	1 $\frac{1}{2}$
6	2.50	7.00	.2040	3 $\frac{1}{16}$	2 $\frac{1}{2}$	36	1.75	5.90	.1065	2 $\frac{1}{16}$	1 $\frac{1}{2}$
7	2.50	7.00	.2010	3 $\frac{3}{4}$	2 $\frac{1}{2}$	37	1.75	5.90	.1040	2 $\frac{1}{2}$	1 $\frac{7}{16}$
8	2.50	7.00	.1990	3 $\frac{1}{16}$	2 $\frac{1}{2}$	38	1.75	5.90	.1015	2 $\frac{7}{16}$	1 $\frac{3}{8}$
9	2.50	7.00	.1960	3 $\frac{1}{16}$	2 $\frac{1}{16}$	39	1.75	5.90	.0995	2 $\frac{7}{16}$	1 $\frac{3}{16}$
10	2.50	7.00	.1935	3 $\frac{5}{8}$	2 $\frac{3}{8}$	40	1.75	5.90	.0980	2 $\frac{3}{8}$	1 $\frac{3}{16}$
11	2.25	6.30	.1910	3 $\frac{9}{16}$	2 $\frac{1}{32}$	41	1.70	5.70	.0960	2 $\frac{5}{16}$	1 $\frac{5}{16}$
12	2.25	6.30	.1890	3 $\frac{1}{16}$	2 $\frac{1}{16}$	42	1.70	5.70	.0935	2 $\frac{1}{16}$	1 $\frac{1}{4}$
13	2.25	6.30	.1850	3 $\frac{1}{2}$	2 $\frac{1}{32}$	43	1.70	5.70	.0890	2 $\frac{1}{4}$	1 $\frac{7}{16}$
14	2.25	6.30	.1820	3 $\frac{7}{16}$	2 $\frac{1}{4}$	44	1.70	5.70	.0860	2 $\frac{3}{16}$	1 $\frac{3}{16}$
15	2.25	6.30	.1800	3 $\frac{1}{16}$	2 $\frac{1}{32}$	45	1.70	5.70	.0820	2 $\frac{3}{16}$	1 $\frac{1}{8}$
16	2.00	6.30	.1770	3 $\frac{3}{8}$	2 $\frac{3}{16}$	46	1.65	5.70	.0810	2 $\frac{1}{8}$	1 $\frac{1}{8}$
17	2.00	6.30	.1730	3 $\frac{5}{16}$	2 $\frac{1}{32}$	47	1.65	5.70	.0785	2 $\frac{1}{16}$	1 $\frac{3}{32}$
18	2.00	6.30	.1695	3 $\frac{5}{16}$	2 $\frac{1}{8}$	48	1.65	5.70	.0760	2 $\frac{1}{16}$	1 $\frac{1}{16}$
19	2.00	6.30	.1660	3 $\frac{1}{4}$	2 $\frac{1}{32}$	49	1.65	5.70	.0730	2	1
20	2.00	6.30	.1610	3 $\frac{3}{16}$	2 $\frac{1}{16}$	50	1.65	5.70	.0700	1 $\frac{15}{16}$	3 $\frac{1}{16}$
21	1.90	6.10	.1590	3 $\frac{3}{16}$	2 $\frac{1}{16}$	51	1.60	5.70	.0670	1 $\frac{15}{16}$	3 $\frac{1}{16}$
22	1.90	6.10	.1570	3 $\frac{1}{8}$	2	52	1.60	5.70	.0635	1 $\frac{7}{8}$	7 $\frac{1}{8}$
23	1.90	6.10	.1540	3 $\frac{1}{16}$	1 $\frac{31}{32}$	53	1.60	.....	.0595	1 $\frac{1}{16}$	2 $\frac{7}{32}$
24	1.90	6.10	.1520	3 $\frac{1}{16}$	1 $\frac{15}{16}$	54	1.60	.....	.0550	1 $\frac{13}{16}$	2 $\frac{7}{32}$
25	1.90	6.10	.1495	3	1 $\frac{3}{32}$	55	1.60	.....	.0520	1 $\frac{3}{4}$	3 $\frac{1}{16}$
26	1.80	6.10	.1470	2 $\frac{15}{16}$	1 $\frac{7}{8}$	56	1.55	.....	.0465	1 $\frac{1}{16}$	2 $\frac{5}{16}$
27	1.80	6.10	.1440	2 $\frac{1}{16}$	1 $\frac{3}{32}$	57	1.55	.....	.0430	1 $\frac{1}{16}$	2 $\frac{3}{32}$
28	1.80	6.10	.1405	2 $\frac{7}{8}$	1 $\frac{13}{16}$	58	1.55	.....	.0420	1 $\frac{5}{8}$	2 $\frac{3}{32}$
29	1.80	6.10	.1360	2 $\frac{3}{16}$	1 $\frac{3}{4}$	59	1.55	.....	.0410	1 $\frac{9}{16}$	1 $\frac{1}{16}$
30	1.80	6.10	.1285	2 $\frac{1}{16}$	1 $\frac{23}{32}$	60	1.55	.....	.0400	1 $\frac{9}{16}$	1 $\frac{1}{16}$

Continued on next page

Packed one dozen of a size in an envelope.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Wire Gauge Twist Drills



No. 107 Carbon Steel (Continued)

Wire Gauge No.	Price Per Dozen	Decimal Diameter Ins.	Length Over All Ins.	Length of Twist Ins.	Wire Gauge No.	Price Per Dozen	Decimal Diameter Ins.	Length Over All Ins.	Length of Twist Ins.
61	\$1.50	.0390	1 1/2	5/8	71	\$1.50	.0260	1 5/16	1/2
62	1.50	.0380	1 1/2	5/8	72	1.50	.0250	1 1/4	7/16
63	1.50	.0370	1 1/2	5/8	73	1.50	.0240	1 1/8	3/8
64	1.50	.0360	1 1/2	5/8	74	1.50	.0225	1 1/8	5/16
65	1.50	.0350	1 1/2	5/8	75	1.50	.0210	1 1/8	1/4
66	1.50	.0330	1 1/2	9/16	76	1.50	.0200	1	1/4
67	1.50	.0320	1 7/16	9/16	77	1.50	.0180	7/8	7/32
68	1.50	.0310	1 7/16	9/16	78	1.50	.0160	7/8	7/32
69	1.50	.02925	1 3/8	9/16	79	1.50	.0145	13/16	3/16
70	1.50	.0280	1 5/16	9/16	80	1.50	.0135	3/4	3/16

Packed 1 dozen of a size in an envelope

Stay-Bolt Drills (Tell-Tale Drills)



105 Carbon Steel

405 High Speed Steel

Diameter Ins.	PRICE PER DOZEN		Length Ins.	Length of Twist Ins.
	Carbon Steel	High Speed		
3/16	\$2.25	\$6.30	3 1/2	2 5/16
7/32	2.75	7.00	3 3/4	2 17/32

Bonding Drills



No. 105F Carbon Steel

No. 508 "Diamond" High Speed

Diameter Ins.	PRICE PER DOZEN		High Speed Shank	Length Ins.	Length of Twist
	Carbon Steel	High Speed			
*3/8	.....	.....	9/32	3	1 3/4
*3/8	.....	.....	3/8	3	1 3/4
9/32	\$3.80	\$9.10		3	1 3/4

*Made only in High Speed for Duplex Channel Pins, Price on application. Specify shank wanted, otherwise 9/32 in. shank will be sent. Specially adapted for drilling holes for bonding wires in track circuit signal work. HIGH SPEED recommended for drilling in hard rails. Packed 1 dozen of a size in an envelope.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

Center Drills

No. 108A Carbon Steel

Diameter Ins.	Price Per Dozen	Length Over All Ins.	Length of Twist Ins.	Diameter Ins.	Price Per Dozen	Length Over All Ins.	Length of Twist Ins.
$\frac{1}{16}$	\$1.60	$1\frac{1}{8}$	$\frac{5}{8}$	$\frac{13}{64}$	\$2.50	$1\frac{1}{2}$	1
$\frac{5}{64}$	1.65	$1\frac{1}{8}$	$\frac{5}{8}$	$\frac{7}{32}$	2.75	$1\frac{1}{2}$	1
$\frac{3}{32}$	1.70	$1\frac{1}{4}$	$\frac{13}{16}$	$\frac{15}{64}$	3.00	$1\frac{1}{2}$	1
$\frac{7}{64}$	1.75	$1\frac{1}{4}$	$\frac{13}{16}$	$\frac{1}{4}$	3.25	$1\frac{1}{2}$	1
$\frac{1}{8}$	1.80	$1\frac{1}{4}$	$\frac{13}{16}$	$\frac{17}{64}$	3.50	$1\frac{1}{2}$	1
$\frac{9}{64}$	1.85	$1\frac{1}{4}$	$\frac{13}{16}$	$\frac{9}{32}$	3.80	$1\frac{1}{2}$	1
$\frac{5}{32}$	1.90	$1\frac{1}{2}$	1	$\frac{13}{64}$	4.00	$1\frac{1}{2}$	1
$\frac{11}{64}$	2.00	$1\frac{1}{2}$	1	$\frac{5}{16}$	4.35	$1\frac{1}{2}$	1
$\frac{3}{16}$	2.25	$1\frac{1}{2}$	1	....	.....	.....	....

Packed 1 Dozen of a size in an envelope.

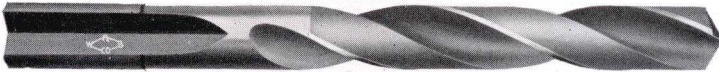
No. 108A Carbon Steel (Wire Gauge)

No. by Gauge	Price Per Dozen	Length Over All Ins.	Length of Twist Ins.	No. by Gauge	Price Per Dozen	Length Over All Ins.	Length of Twist Ins.
30	\$1.80	$1\frac{1}{4}$	$\frac{13}{16}$	45	\$1.70	$1\frac{1}{4}$	$\frac{13}{16}$
35	1.75	$1\frac{1}{4}$	$\frac{13}{16}$	50	1.65	$1\frac{1}{4}$	$\frac{13}{16}$
40	1.75	$1\frac{1}{4}$	$\frac{13}{16}$	55	1.60	$1\frac{1}{4}$	$\frac{13}{16}$

Packed 1 Dozen of a size in an envelope.

Two Grooved Shank Drills

TAPER LENGTH



No. 104D Carbon Steel

No. 404D "Diamond" High Speed

Dimensions and List Prices same as Straight Shank, Taper Length Drills No. 104 and 404, pages 10, 11 and 12.

JOBBER'S LENGTH

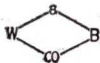


No. 105D Carbon Steel

No. 405D "Diamond" High Speed

Dimensions, List Prices and Packing same as Jobbers' Length, Straight Shank No. 105 and No. 405, page 13.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Drills with Shanks as per Lists Nos. 110 and 506 Will Fit Drill Presses

- D. H. POTTS, Lancaster, Pa., Nos. 1, 2, 3½, 10, 11 and 12
 BOYNTON & PLUMMER, Worcester, Mass., Nos. 3, 4 and 5
 ILLINOIS IRON & BOLT CO., Carpentersville, Ill.,
 Bailey No. 5 and Illinois Upright.
 SILVER MFG. CO., Salem, Ohio, Nos. 3 and 4
 WILEY & RUSSELL MFG. CO., Greenfield, Mass.,
 Nos. 732, 742, 743, 744 and 745
 WELLS BROS. & CO., Greenfield, Mass., No. 1
 ASA GODDARD, Worcester, Mass., No. 3
 BUDA FOUNDRY & MFG. CO., Chicago, Paulus Track Drill
 FRANCIS REED & CO., Worcester, Mass., Nos. 3, 6, 7, 12, 14, 18 and 19
 SHEFFIELD CAR CO., Three Rivers, Mich., No. 5 Track Drill
 CANEDY-OTTO MFG. CO., Chicago Heights, Ill.
 B. B. NOYES & CO., Greenfield, Mass., . . . All sizes Little Giant Drills
 CHAMPION BLOWER FORGE CO., Lancaster, Pa., . . . All sizes if ordered

Drills with Shanks as per Lists Nos. 111, 411, 112 and 412

- BOYNTON & PLUMMER, Worcester, Mass.,
 All sizes except Nos. 14, 15 and 16
 BUFFALO FORGE CO., Buffalo, N. Y., All sizes
 CHAMPION BLOWER & FORGE CO., Lancaster, Pa., All sizes
 GEO. BURNHAM & CO., Worcester, Mass., Nos. 0, 1, 2 and 5
 GEO. C. TAFT, Worcester, Mass.,
 No. 2, old or new style or horizontal, Nos. 2½ and 3
 ASA GODDARD, Worcester, Mass., Nos. 2 and 4
 ILLINOIS IRON & BOLT CO., Carpentersville, Ill.,
 Bailey, Nos. 2, 3, 4, Handy 0, 1
 SILVER MFG. CO., Salem, Ohio, Nos. 1, 1½, 2, 3, 12, 13, 14
 WILEY & RUSSELL MFG. CO., Greenfield, Mass.,
 Nos. 701, 706, 730, 734, 740 and 751
 M. L. EDWARDS MFG. CO., Salem, Ohio, All sizes
 MILLERS FALLS CO., Millers Falls, Mass., No. 5 Track Drill
 CANEDY-OTTO MFG. CO., Chicago Heights, Ill.
 D. H. POTTS, Lancaster, Pa., All sizes
 FRANCIS REED & CO., Worcester, Mass.,
 Nos. 0, 1, 1½, 2, 5, 8, 9, 11, 13, 18
 B. B. NOYES & CO., Greenfield, Mass., Nos. 2, 4, 5, 6, 12, 14, 16, 18D5
 GEO. S. COMSTOCK, Mechanicsburg, Pa.,
 Comstock's Ball Bearing, Figure 500

Coe's Drills

FITTING COE'S BLACKSMITHS' DRILL PRESS AND
PRENTICE DRILL PRESS No. 3



STYLE No. 1



STYLE No. 2

No. 110 Carbon Steel

Shanks .648 inches diameter (commonly called $\frac{11}{16}$) and $2\frac{1}{4}$ inches long.

Diameter Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.	Diameter Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.
	Carbon Steel					Carbon Steel			
$\frac{1}{8}$	\$0.50		$4\frac{7}{8}$	2	$\frac{31}{32}$	\$2.40		6	$3\frac{5}{16}$
$\frac{5}{32}$	.55		$5\frac{1}{8}$	$2\frac{1}{4}$	1	2.50		6	$3\frac{5}{16}$
$\frac{3}{16}$	.60		$5\frac{3}{8}$	$2\frac{1}{2}$	$1\frac{1}{32}$	2.60		6	$3\frac{1}{4}$
$\frac{7}{32}$	.65		$5\frac{5}{8}$	$2\frac{3}{4}$	$1\frac{1}{16}$	2.70		6	$3\frac{1}{4}$
$\frac{1}{4}$	.70		6	$3\frac{1}{8}$	$1\frac{3}{32}$	2.80		6	$3\frac{1}{4}$
$\frac{9}{32}$	.75		6	$3\frac{1}{8}$	$1\frac{1}{8}$	2.90		6	$3\frac{1}{4}$
$\frac{5}{16}$	.80		6	$3\frac{1}{8}$	$1\frac{5}{32}$	3.00		6	$3\frac{1}{4}$
$\frac{11}{32}$	.85		6	$3\frac{1}{8}$	$1\frac{3}{16}$	3.10		6	$3\frac{1}{4}$
$\frac{3}{8}$	.90		6	$3\frac{1}{4}$	$1\frac{7}{32}$	3.20		6	$3\frac{1}{4}$
$\frac{13}{32}$	.95		6	$3\frac{1}{4}$	$1\frac{1}{4}$	3.30		6	$3\frac{1}{4}$
$\frac{7}{16}$	1.00		6	$3\frac{1}{4}$	$1\frac{9}{32}$	3.45		6	$3\frac{1}{4}$
$\frac{15}{32}$	1.05		6	$3\frac{1}{4}$	$1\frac{5}{16}$	3.60		6	$3\frac{1}{4}$
$\frac{1}{2}$	1.10		6	$3\frac{5}{16}$	$1\frac{11}{32}$	3.75		6	$3\frac{1}{4}$
$\frac{17}{32}$	1.15		6	$3\frac{5}{16}$	$1\frac{3}{8}$	3.90		6	$3\frac{1}{4}$
$\frac{9}{16}$	1.20		6	$3\frac{5}{16}$	$1\frac{13}{32}$	4.05		6	$3\frac{1}{4}$
$\frac{19}{32}$	1.25		6	$3\frac{5}{16}$	$1\frac{7}{16}$	4.20		6	$3\frac{1}{4}$
$\frac{5}{8}$	1.30		6	$3\frac{5}{16}$	$1\frac{15}{32}$	4.35		6	$3\frac{1}{4}$
$\frac{21}{32}$	1.40		6	$3\frac{5}{16}$	$1\frac{1}{2}$	4.50		6	$3\frac{1}{4}$
$\frac{11}{16}$	1.50		6	$3\frac{5}{16}$	$1\frac{9}{16}$	5.00		6	$3\frac{1}{8}$
$\frac{23}{32}$	1.60		6	$3\frac{5}{16}$	$1\frac{5}{8}$	5.50		6	$3\frac{1}{8}$
$\frac{3}{4}$	1.70		6	$3\frac{5}{16}$	$1\frac{11}{16}$	6.00		6	$3\frac{1}{8}$
$\frac{25}{32}$	1.80		6	$3\frac{5}{16}$	$1\frac{3}{4}$	6.50		6	$3\frac{1}{8}$
$\frac{13}{16}$	1.90		6	$3\frac{5}{16}$	$1\frac{13}{16}$	7.00		6	$3\frac{1}{8}$
$\frac{27}{32}$	2.00		6	$3\frac{5}{16}$	$1\frac{7}{8}$	8.00		6	$3\frac{1}{8}$
$\frac{7}{8}$	2.10		6	$3\frac{5}{16}$	$1\frac{15}{16}$	9.00		6	$3\frac{1}{8}$
$\frac{29}{32}$	2.20		6	$3\frac{5}{16}$	2	10.00		6	$3\frac{1}{8}$
$\frac{15}{16}$	2.30		6	$3\frac{5}{16}$					

HIGH SPEED furnished in sizes over 1 inch in diameter with .648 shank at customer's risk only. We consider this shank too weak in larger sizes.

Style No. 2 furnished unless otherwise ordered.

Drills ordered with shanks other than specified above will be considered special and charged as such, price based on quantity ordered.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Silver and Deming Drills

BLACKSMITHS SHORT LENGTH



STYLE No. 1



STYLE No. 2

No. 112 Carbon Steel.
No. 412 "Diamond" High Speed

Shanks 1/2-inch diameter and 2 1/4-inches long.

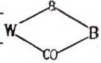
Diam. Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.	Diam. Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.
	Carbon Steel	High Speed				Carbon Steel	High Speed		
1/8	\$0.45		47/8	2	27/32	\$2 00	\$3.15	6	3 5/16
5/32	.45		51/8	2 1/4	7/8	2.10	3.30	6	3 5/16
3/16	.50		53/8	2 1/2	29/32	2.20	3.50	6	3 5/16
7/32	.55		55/8	2 3/4	15/16	2.30	3.70	6	3 5/16
1/4	.60	\$1.10	6	3 1/8	31/32	2.40	3.90	6	3 5/16
9/32	.65	1.20	6	3 1/8	1	2.50	4.10	6	3 5/16
5/16	.70	1.30	6	3 1/8	1 1/32	2.60	4.30	6	3 1/4
11/32	.75	1.40	6	3 1/8	1 1/16	2.70	4.50	6	3 1/4
3/8	.80	1.45	6	3 1/4	1 3/32	2.80	4.75	6	3 1/4
13/32	.85	1.55	6	3 1/4	1 1/8	2.90	5.00	6	3 1/4
7/16	.90	1.60	6	3 1/4	1 5/32	3.00	5.25	6	3 1/4
15/32	.95	1.70	6	3 1/4	1 7/16	3.10	5.50	6	3 1/4
1/2	1.00	1.75	6	3 5/16	1 3/2	3.20	5.80	6	3 1/4
13/32	1.05	1.90	6	3 5/16	1 1/4	3.30	6.10	6	3 1/4
9/16	1.10	2.05	6	3 5/16	1 9/32	3.45	6.40	6	3 1/4
19/32	1.20	2.20	6	3 5/16	1 5/16	3.60	6.70	6	3 1/4
5/8	1.30	2.30	6	3 5/16	1 11/16	3.75	7.00	6	3 1/4
11/16	1.40	2.40	6	3 5/16	1 3/8	3.90	7.40	6	3 1/4
13/16	1.50	2.50	6	3 5/16	1 13/32	4.05	7.80	6	3 1/4
3/4	1.60	2.65	6	3 5/16	1 7/16	4.20	8.20	6	3 1/4
25/32	1.70	2.75	6	3 5/16	1 15/16	4.35	8.60	6	3 1/4
11/8	1.80	2.90	6	3 5/16	1 1/2	4.50	9.00	6	3 1/4
13/8	1.90	3.00	6	3 5/16					

HIGH SPEED furnished in sizes over 3/4-in. diameter with 1/2-in. shank at customer's risk only. We consider 1/2-in. shanks too weak in larger sizes.

Style No. 2 furnished unless otherwise ordered.

Drills ordered with shanks other than specified above will be considered special and charged as such, price based on quantity ordered.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Prentice Drills

BLACKSMITHS' TAPER LENGTH



STYLE No. 1



STYLE No. 2

No. 111 Carbon Steel

No. 411 "Diamond" High Speed

Shanks 1/2-inch diameter and 2 1/2-inches long.

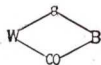
Diameter Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.	Diameter Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.
	Carbon Steel	High Speed				Carbon Steel	High Speed		
1/8	\$0.45	.....	5 1/8	2	27/32	\$2.40	\$4.40	10 1/4	7 1/4
5/32	.45	.....	5 3/8	2 1/4	7/8	2.60	4.75	10 1/2	7 7/16
3/16	.50	.....	5 5/8	2 1/2	29/32	2.80	5.15	10 5/8	7 9/16
7/32	.55	.....	5 7/8	2 3/4	15/16	3.00	5.50	10 3/4	7 11/16
1/4	.60	\$1.10	6 1/8	3 1/8	31/32	3.25	5.90	10 7/8	7 13/16
9/32	.65	1.20	6 1/4	3 5/16	1	3.50	6.25	11	7 15/16
5/16	.70	1.30	6 3/8	3 7/16	1 1/32	3.75	6.75	11 1/8	8
11/32	.75	1.40	6 1/2	3 9/16	1 1/16	4.00	7.25	11 1/4	8 1/8
3/8	.80	1.50	6 3/4	3 13/16	1 3/32	4.25	7.75	11 1/2	8 3/8
13/32	.90	1.65	7	4 1/16	1 1/8	4.50	8.25	11 3/4	8 5/8
7/16	1.00	1.75	7 1/4	4 5/16	1 1/4	4.75	8.90	11 7/8	8 3/4
15/32	1.10	1.90	7 1/2	4 9/16	1 3/16	5.00	9.50	12	8 7/8
1/2	1.20	2.00	7 3/4	4 13/16	1 7/32	5.25	10.15	12 1/8	9
17/32	1.30	2.15	8	5 1/16	1 1/2	5.50	10.75	12 1/2	9 3/8
9/16	1.40	2.25	8 1/4	5 5/16	1 1/4	5.75	11.50	12 1/2	9 3/8
19/32	1.50	2.40	8 1/2	5 9/16	1 5/16	6.00	12.25	12 1/2	9 3/8
5/8	1.60	2.50	8 3/4	5 13/16	1 11/32	6.25	13.00	12 1/2	9 3/8
21/32	1.70	2.75	9	6	1 1/2	6.50	13.75	12 1/2	9 3/8
11/16	1.80	3.00	9 1/4	6 1/4	1 13/32	7.00	14.65	12 1/2	9 3/8
13/16	1.90	3.25	9 1/2	6 1/2	1 7/16	7.50	15.50	12 1/2	9 3/8
3/4	2.00	3.50	9 3/4	6 3/4	1 15/32	8.00	16.40	12 1/2	9 3/8
7/8	2.10	3.75	9 7/8	6 7/8	1 1/2	8.50	17.25	12 1/2	9 3/8
1 1/16	2.20	4.00	10	7					

HIGH SPEED drills with half inch shanks furnished in sizes over 3/4 in. diameter at customer's risk only. We consider 1/2 inch shank too weak in larger sizes.

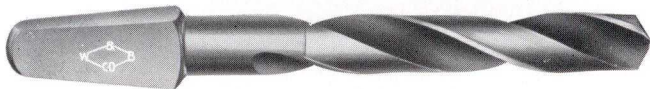
Style No. 2 furnished unless otherwise ordered.

Drills ordered with shanks other than specified above will be considered special and charged as such, price based on quantity ordered.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Taper Square Shank Ratchet Drills



No. 109E Carbon Steel

Diam. Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.	Diam. Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.
	Carbon Steel					Carbon Steel			
1/8	\$0.90		4 1/4	2	3 1/2	\$2.40		8 1/4	6 1/8
5/32	.95		4 5/8	2 1/4	1	2.55		8 1/2	6 3/8
3/16	.95		4 3/4	2 3/8	1 1/32	2.70		8 3/4	6 5/8
7/32	1.00		4 7/8	2 5/8	1 1/16	2.85		9	6 7/8
1/4	1.00		5	2 3/4	1 3/32	3.00		9	6 7/8
9/32	1.05		5	2 3/4	1 1/8	3.10		9	6 7/8
5/16	1.10		5	2 7/8	1 5/32	3.25		9	6 7/8
11/32	1.15		5	2 7/8	1 3/16	3.35		9	6 7/8
3/8	1.20		6	3 7/8	1 7/32	3.50		9	6 7/8
13/32	1.25		6 1/4	4 1/8	1 1/4	3.65		9	6 7/8
7/16	1.25		6 1/4	4 1/8	1 9/32	3.75		9	6 13/16
15/32	1.30		6 1/4	4 1/8	1 5/16	3.90		9	6 13/16
1/2	1.30		6 1/2	4 3/8	1 11/32	4.05		9	6 13/16
17/32	1.35		6 1/2	4 3/8	1 3/8	4.20		9	6 13/16
9/16	1.35		6 1/2	4 3/8	1 13/32	4.35		9	6 13/16
19/32	1.40		6 1/2	4 3/8	1 7/16	4.50		9	6 13/16
5/8	1.40		6 1/2	4 3/8	1 15/32	4.65		9	6 13/16
21/32	1.45		6 1/2	4 3/8	1 1/2	4.80		9	6 13/16
11/16	1.45		6 1/2	4 3/8	1 9/16	5.10		9	6 13/16
23/32	1.50		6 1/2	4 3/8	1 5/8	5.40		9	6 13/16
3/4	1.55		6 1/2	4 3/8	1 11/16	5.75		9	6 3/4
25/32	1.65		6 1/2	4 3/8	1 3/4	6.10		9	6 3/4
13/16	1.75		7	4 7/8	1 13/16	6.50		9	6 3/4
16/32	1.90		7	4 7/8	1 7/8	6.90		9	6 3/4
27/32	2.05		7 1/2	5 3/8	1 15/16	7.30		9	6 3/4
7/8	2.20		7 3/4	5 5/8	2	7.75		9	6 3/4
15/16	2.30		8	5 7/8					

A Shanks—3/8 inch by 5/8 inch by 1 1/2 inches long.

B Shanks—1/2 inch by 3/4 inch by 1 3/4 inches long.

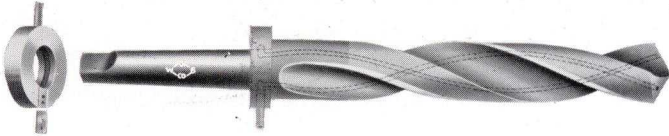
Unless otherwise specified A shank will be furnished. On HIGH SPEED over 1 inch, B shank will be furnished.

Packed: Sizes 1/8 to 5/8 in., one dozen; 1/4 to 1 in., one-half dozen; 1 1/4 to 1 1/2 in., one-third dozen; 1 1/2 to 1 3/4 in., one-sixth dozen of a size in a package.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

Self Oiling Drills

WITH TAPER SHANKS AND HOLES
THROUGH SOLID METAL FOR LUBRICANT



Style B Carbon Steel

Diam. Ins.	Price Each Carbon Steel	Length Over All Ins.	Length of Twist Ins.	Shank Taper	Diam. Ins.	Price Each Carbon Steel	Length Over All Ins.	Length of Twist Ins.	Shank Taper
$\frac{1}{2}$	\$4.00	$8\frac{1}{8}$	$4\frac{5}{8}$	No. 1	$1\frac{9}{32}$	\$9.40	$14\frac{3}{4}$	$8\frac{1}{2}$	No. 4
$\frac{17}{32}$	4.15	$8\frac{3}{8}$	$4\frac{7}{8}$		$1\frac{5}{16}$	10.15	$14\frac{7}{8}$	$8\frac{5}{8}$	
$\frac{9}{16}$	4.30	$8\frac{5}{8}$	$5\frac{1}{8}$		$1\frac{11}{32}$	10.95	15	$8\frac{3}{4}$	
$\frac{19}{32}$	4.50	$8\frac{7}{8}$	$4\frac{7}{8}$		$1\frac{3}{8}$	11.80	$15\frac{1}{8}$	$8\frac{7}{8}$	
$\frac{21}{32}$	4.70	$9\frac{1}{8}$	$5\frac{1}{16}$		$1\frac{13}{32}$	12.30	$15\frac{1}{4}$	9	
$\frac{23}{32}$	4.80	$9\frac{3}{8}$	$5\frac{5}{16}$		$1\frac{7}{16}$	12.85	$15\frac{3}{8}$	$9\frac{1}{8}$	
$\frac{11}{16}$	4.95	$9\frac{5}{8}$	$5\frac{1}{2}$		$1\frac{15}{32}$	13.35	$15\frac{1}{2}$	$9\frac{1}{4}$	
$\frac{25}{32}$	5.10	$9\frac{7}{8}$	$5\frac{3}{4}$		$1\frac{1}{2}$	14.00	$15\frac{5}{8}$	$9\frac{3}{8}$	
$\frac{27}{32}$	5.20	$10\frac{1}{8}$	6		$1\frac{17}{32}$	14.20	$15\frac{3}{4}$	$9\frac{1}{2}$	
$\frac{29}{32}$	5.35	$10\frac{1}{4}$	$6\frac{3}{16}$		$1\frac{9}{16}$	14.40	$15\frac{7}{8}$	$9\frac{5}{8}$	
$\frac{31}{32}$	5.50	$10\frac{3}{8}$	$6\frac{5}{16}$	$1\frac{11}{32}$	14.70	16	$9\frac{3}{4}$		
$\frac{1}{16}$	5.70	$10\frac{5}{8}$	$6\frac{9}{16}$	$1\frac{13}{32}$	15.00	$16\frac{1}{8}$	$9\frac{7}{8}$		
$\frac{17}{32}$	5.90	$10\frac{7}{8}$	$6\frac{13}{16}$	$1\frac{15}{32}$	15.35	$16\frac{1}{4}$	10		
$\frac{23}{32}$	6.05	11	$6\frac{15}{16}$	$1\frac{17}{32}$	15.70	$16\frac{3}{8}$	$10\frac{1}{8}$		
$\frac{15}{16}$	6.20	$11\frac{1}{4}$	$6\frac{1}{4}$	$1\frac{3}{4}$	16.10	$16\frac{1}{2}$	$10\frac{1}{4}$		
$\frac{31}{32}$	6.35	$11\frac{3}{8}$	$6\frac{3}{8}$	$1\frac{7}{8}$	16.50	$16\frac{5}{8}$	$10\frac{1}{4}$		
1	6.50	$11\frac{1}{2}$	$6\frac{1}{2}$	$1\frac{15}{16}$	16.75	$16\frac{3}{4}$	$10\frac{1}{4}$		
$1\frac{1}{32}$	6.80	$11\frac{5}{8}$	$6\frac{5}{8}$	$1\frac{1}{2}$	17.00	$16\frac{7}{8}$	$10\frac{3}{8}$		
$1\frac{1}{16}$	7.10	$11\frac{3}{4}$	$6\frac{3}{4}$	$1\frac{3}{4}$	17.25	17	$10\frac{1}{2}$		
$1\frac{3}{32}$	7.45	12	7	$1\frac{7}{8}$	17.50	$17\frac{1}{8}$	$10\frac{9}{16}$		
$1\frac{1}{8}$	7.80	$12\frac{1}{4}$	$7\frac{1}{4}$	$1\frac{23}{32}$	17.85	$17\frac{1}{8}$	$10\frac{9}{16}$		
$1\frac{5}{32}$	8.00	$12\frac{3}{8}$	$7\frac{3}{8}$	$1\frac{25}{32}$	18.20	$17\frac{1}{8}$	$10\frac{9}{16}$		
$1\frac{7}{16}$	8.20	$12\frac{1}{2}$	$7\frac{1}{2}$	$1\frac{27}{32}$	18.60	$17\frac{1}{8}$	$10\frac{9}{16}$		
$1\frac{7}{32}$	8.40	$12\frac{5}{8}$	$7\frac{5}{8}$	$1\frac{29}{32}$	19.00	$17\frac{1}{8}$	$10\frac{9}{16}$		
$1\frac{1}{4}$	8.70	13	8	2					

Sixty-fourth sizes take list of next larger size.

***HIGH SPEED PRICES QUOTED ON RECEIPT OF SPECIFICATIONS.**

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Self Oiling Drills

WITH STRAIGHT SHANKS AND HOLES THROUGH SOLID METAL FOR LUBRICANT



Style C Carbon Steel

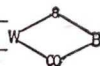
***Style 4C "Diamond" High Speed**

Diameter Inches	PRICE EACH			LENGTH OF TWIST, INS.		
	Length Over All 8½ Ins.	Length Over All 10¼ Ins.	Length Over All 13 Ins.	Length Over All 8½ Ins.	Length Over All 10¼ Ins.	Length Over All 13 Ins.
1/2	\$4.60	\$5.30	\$5.90	5 1/2	7	9 1/4
3/8	4.60	5.30	6.00	5 1/4	7	9 1/4
7/16	4.70	5.40	6.00	5 1/4	7	9 1/4
1/2	4.70	5.40	6.10	5 1/4	7	9 1/4
9/16	4.70	5.40	6.10	5 1/4	7	9 1/4
5/8	4.70	5.40	6.20	5 1/4	7	9 1/4
11/16	4.80	5.40	6.20	5 1/4	7	9 1/4
3/4	4.80	5.40	6.30	5 1/4	7	9 1/4
13/16	4.80	5.40	6.30	5 1/4	7	9 1/4
7/8	4.90	5.50	6.40	5 1/4	7	9 1/4
15/16	5.00	5.60	6.50	5 1/4	7	9 1/4
1	5.00	5.80	6.60	5 1/4	7	9 1/4
1 1/8	5.10	5.90	6.80	5 1/4	7	9 1/4
1 1/4	5.20	6.00	6.90	5 1/4	7	9 1/4
1 1/2	5.30	6.10	7.00	5 1/4	7	9 1/4
1 3/4	5.40	6.20	7.10	5 1/4	7	9 1/4
1 7/8	5.50	6.30	7.20	5 1/4	7	9 1/4
1 5/8	5.60	6.50	7.40	5	6 3/4	9
1 1/2	5.80	6.80	7.70	5	6 3/4	9
1 3/4	6.00	7.00	7.90	5	6 3/4	9
1 7/8	6.10	7.20	8.10	5	6 3/4	9
1 5/8	6.30	7.40	8.30	5	6 3/4	9
1 3/4	6.50	7.60	8.60	5	6 3/4	9
1 7/8	6.70	7.80	8.80	5	6 3/4	9
1 1/4	6.80	7.90	9.00	5	6 3/4	9

Sixty-fourth sizes take list of next larger size.

***HIGH SPEED PRICES QUOTED ON RECEIPT OF SPECIFICATIONS.**

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Self Oiling Drills

WITH STRAIGHT SHANKS AND HOLES
THROUGH SOLID METAL FOR LUBRICANT



Style C Carbon Steel

***Style 4C "Diamond" High Speed**

Diameter Inches	PRICE EACH			LENGTH OF TWIST, INS.		
	Length Over All 8½ Ins.	Length Over All 10½ Ins.	Length Over All 13 Ins.	Length Over All 8½ Ins.	Length Over All 10½ Ins.	Length Over All 13 Ins.
1 ⁹ / ₃₂	\$7.10	\$8.30	\$9.30	5	6 ³ / ₄	9
1 ⁵ / ₁₆	7.40	8.60	9.60	5	6 ³ / ₄	9
1 ¹ / ₃₂	7.70	9.00	10.00	5	6 ³ / ₄	9
1 ³ / ₈	8.00	9.30	10.30	5	6 ³ / ₄	9
1 ¹ / ₃₂	8.30	9.60	10.70	5	6 ³ / ₄	9
1 ⁷ / ₁₆	8.60	9.90	11.20	5	6 ³ / ₄	9
1 ¹ / ₃₂	8.90	10.30	11.50	5	6 ³ / ₄	9
1 ¹ / ₂	9.20	10.50	11.90	5	6 ³ / ₄	9
1 ¹ / ₃₂	9.40	10.70	12.00	4 ³ / ₄	6 ¹ / ₂	8 ³ / ₄
1 ⁹ / ₁₆	9.60	10.90	12.10	4 ³ / ₄	6 ¹ / ₂	8 ³ / ₄
1 ¹ / ₃₂	9.80	11.00	12.20	4 ³ / ₄	6 ¹ / ₂	8 ³ / ₄
1 ⁵ / ₈	10.00	11.20	12.40	4 ³ / ₄	6 ¹ / ₂	8 ³ / ₄
1 ² / ₃₂	10.20	11.40	12.50	4 ³ / ₄	6 ¹ / ₂	8 ³ / ₄
1 ¹ / ₁₆	10.30	11.50	12.70	4 ³ / ₄	6 ¹ / ₂	8 ³ / ₄
1 ² / ₃₂	10.40	11.60	12.90	4 ³ / ₄	6 ¹ / ₂	8 ³ / ₄
1 ³ / ₄	10.50	11.80	13.00	4 ³ / ₄	6 ¹ / ₂	8 ³ / ₄
1 ² / ₃₂	10.70	12.00	13.20	4 ³ / ₄	6 ¹ / ₂	8 ³ / ₄
1 ¹ / ₁₆	10.90	12.20	13.40	4 ³ / ₄	6 ¹ / ₂	8 ³ / ₄
1 ² / ₃₂	11.00	12.40	13.60	4 ³ / ₄	6 ¹ / ₂	8 ³ / ₄
1 ¹ / ₈	11.20	12.50	13.70	4 ³ / ₄	6 ¹ / ₂	8 ³ / ₄
1 ² / ₃₂	11.40	12.70	14.00	4 ³ / ₄	6 ¹ / ₂	8 ³ / ₄
1 ¹ / ₁₆	11.60	12.90	14.20	4 ³ / ₄	6 ¹ / ₂	8 ³ / ₄
1 ¹ / ₃₂	11.90	13.10	14.40	4 ³ / ₄	6 ¹ / ₂	8 ³ / ₄
2	12.10	13.30	14.60	4 ³ / ₄	6 ¹ / ₂	8 ³ / ₄

Sixty-fourth sizes take list of next larger size.

Drills 1 ¹/₃₂ to 2 inches diameter, 8½ inches long, have shanks 1½ inches diameter 3 inches long.

Drills 1 ¹/₃₂ to 2 inches diameter, 10½ inches long, have shanks 1½ inches diameter 3½ inches long.

Drills 1 ¹/₃₂ to 2 inches diameter, 13 inches long, have shanks 1½ inches diameter, 3½ inches long.

***HIGH SPEED PRICES QUOTED ON RECEIPT OF SPECIFICATIONS.**

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Three Groove Twist Drills—Taper Shank



No. 102B Carbon Steel

Diam. Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.	Shank Taper	Diam. Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.	Shank Taper
	Carbon Steel						Carbon Steel				
1/4	\$1.00		6 1/8	3	No. 1	1 3/8	\$6.50		14 1/2	8 7/8	No. 4
3/8	1.05		6 1/4	3 1/16		1 3/2	7.00		14 5/8	9	
5/16	1.10		6 3/8	3 1/8		1 1/16	7.50		14 3/4	9 1/8	
1 1/32	1.15		6 1/2	3 5/16		1 1/32	8.00		14 7/8	9 1/4	
3/8	1.20		6 3/4	3 9/16		1 1/2	8.50		15	9 3/8	
1 1/32	1.25		7	3 13/16		1 1/2	9.00		15 1/8	9 1/2	
7/16	1.30		7 1/4	4 1/16		1 1/16	9.50		15 1/4	9 5/8	
1 1/32	1.40		7 1/2	4 3/8		1 1/32	10.00		15 3/8	9 3/4	
1 1/2	1.50		7 3/4	4 5/8		1 5/8	10.50		15 1/2	9 7/8	
1 7/32	1.60		8	4 7/8		1 2 1/32	11.00		15 5/8	10	
2	1.70		8 1/4	5 1/8		1 1 2/32	11.50		15 3/4	10 1/8	
1 9/32	1.80		8 1/2	4 7/8		1 3/4	12.00		15 7/8	10 1/4	
5/8	1.90		8 3/4	5 1/16		1 3/4	12.50		16	10 1/4	
2 1/32	2.00		9	5 3/8		1 2 5/32	13.25		16 1/8	10 1/4	
1 1/16	2.10		9 1/4	5 1/2		1 1 3/32	14.00		16 1/4	10 3/8	
2 1/16	2.25		9 1/2	5 3/4		1 2 1/32	14.75		16 3/8	10 1/2	
3 1/4	2.40		9 3/4	6	1 7/8	15.50		16 1/2	10 9/16		
2 3/8	2.55		9 7/8	6 3/8	1 2 3/32	16.25		16 1/2	10 9/16		
2 7/8	2.70		10	6 5/16	1 1 5/16	17.00		16 1/2	10 9/16		
2 8/16	2.85		10 1/4	6 7/16	1 3 1/32	17.75		16 1/2	10 9/16		
2 7/8	3.00		10 1/2	6 13/16	2	18.50		16 1/2	10 9/16		
2 3/2	3.15		10 5/8	6 1 5/16	2 1/2	19.25		16 1/2	9 1/2		
1 5/16	3.30		10 3/4	6 1/4	2 1/16	20.00		17	10 1/16		
3 1/32	3.45		10 7/8	6 3/8	2 1/8	21.50		17	10 1/16		
1	3.60		11	6 1/2	2 1/16	23.00		17	10 1/16		
1 1/32	3.75		11 1/8	6 5/8	2 1/4	24.50		17 1/2	10 9/16		
1 1/16	4.00		11 1/4	6 3/4	2 1/16	26.00		17 1/2	10 9/16		
1 3/32	4.25		11 1/2	7	2 3/8	27.50		18	10 7/8		
1 1/8	4.50		11 3/4	7 1/4	2 1/16	29.00		18 1/2	11 3/8		
1 3/16	4.75		11 7/8	7 3/8	2 1/2	30.50		19	11 7/8		
1 1/4	5.00		12	7 1/2	2 1/16	32.00		19 1/4	12 1/8		
1 1/2	5.25		12 1/8	7 5/8	2 5/8	34.00	.50	19 1/2	12 3/8		
1 3/4	5.50		12 1/2	8	2 1 1/16	36.00	88.75	20	12 7/8		
1 9/16	5.75		14 1/8	8 1/2	2 3/4	38.00	95.00	20 1/2	13 1/4		
1 1/2	6.00		14 1/4	8 5/8	2 1 3/16	40.50	102.50	20 1/2	13 1/4		
1 1 1/2	6.25		14 3/8	8 3/4	2 7/8	43.00	110.00	21	13 3/4		
					2 1 1/16	45.50	117.50	21	13 3/4		
					3	48.00	125.00	22	14 5/8		

Thirty-second sizes not listed take list midway between sixteenth sizes. Sixty-fourth sizes furnished at list of next larger size.

Designed for enlarging cored, punched or drilled holes. Will not drill solid metal.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

Three Groove Twist Drills—Straight Shank



No. 104B Carbon Steel

Diameter Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.	Diameter Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.
	Carbon Steel					Carbon Steel			
1/4	\$1.00		6 1/8	4 1/8	1 3/32	\$7.00		14 5/8	9 1/2
5/16	1.05		6 1/4	4 1/8	1 7/16	7.50		14 3/4	9 5/8
3/8	1.10		6 3/8	4 1/8	1 1/2	8.00		14 7/8	9 3/4
7/16	1.15		6 1/2	4 1/4	1 1/2	8.50		15	9 7/8
1/2	1.20		6 3/4	4 1/4	1 3/2	9.00		15 1/8	10
9/16	1.25		7	4 3/8	1 9/16	9.50		15 1/4	10 1/8
5/8	1.30		7 1/4	4 5/8	1 13/16	10.00		15 3/8	10 1/4
11/16	1.40		7 1/2	4 7/8	1 7/8	10.50		15 1/2	10 3/8
3/4	1.50		7 3/4	5	1 21/32	11.00		15 5/8	10 1/2
13/16	1.60		8	5 1/4	1 11/16	11.50		15 3/4	10 5/8
7/8	1.70		8 1/4	5 3/8	1 23/32	12.00		15 7/8	10 3/4
15/16	1.80		8 1/2	5 5/8	1 3/4	12.50		16	10 7/8
1	1.90		8 3/4	5 3/4	1 25/32	13.25		16 1/8	10 1/8
1 1/16	2.00		9	5 7/8	1 13/16	14.00		16 1/4	10 1/4
1 1/8	2.10		9 1/4	6	1 27/32	14.75		16 3/8	10 5/8
1 1/4	2.25		9 1/2	6 3/16	1 7/8	15.50		16 1/2	10 1/2
1 1/2	2.40		9 3/4	6 3/8	1 29/32	16.25		16 1/2	10 1/2
1 3/4	2.55		9 7/8	6 1/2	1 15/16	17.00		16 1/2	10 1/2
2	2.70		10	6 5/8	1 31/32	17.75		16 1/2	10 1/2
2 1/16	2.85		10 1/4	6 3/4	2	18.50		16 1/2	10 1/2
2 1/8	3.00		10 1/2	7	2 1/32	19.25		16 1/2	9 7/8
2 1/4	3.15		10 5/8	7	2 1/16	20.00		17	10 3/8
2 1/2	3.30		10 3/4	7 1/8	2 1/8	21.50		17	10 3/8
2 3/4	3.45		10 7/8	7 3/8	2 3/16	23.00		17	10 3/8
3	3.60		11	7 1/2	2 1/4	24.50		17 1/2	10 7/8
3 1/16	3.75		11 1/8	7 5/16	2 5/16	26.00		17 1/2	10 7/8
3 1/8	4.00		11 1/4	7 3/8	2 3/8	27.50		18	11 3/8
3 1/4	4.25		11 1/2	7 5/8	2 7/16	29.00		18 1/2	11 7/8
3 1/2	4.50		11 3/4	7 7/8	2 1/2	30.50		19	12 3/8
3 3/4	4.75		11 7/8	8	2 9/16	32.00		19 1/4	12 5/8
4	5.00		12	8 1/8	2 5/8	34.00		19 1/2	12 7/8
4 1/16	5.25		12 1/8	8 1/8	2 11/16	36.00		20	13 3/8
4 1/8	5.50		12 1/2	8 1/2	2 3/4	38.00		20 1/2	13 7/8
4 1/4	5.75		14 1/8	9 1/8	2 13/16	40.50		20 1/2	13 7/8
4 1/2	6.00		14 1/4	9 1/4	2 7/8	43.00		21	14 3/8
4 3/4	6.25		14 3/8	9 3/8	2 15/16	45.50		21	14 3/8
5	6.50		14 1/2	9 1/2	3	48.00		22	15 3/8

Thirty-second sizes not listed take list midway between sixteenth sizes. Sixty-fourth sizes furnished at list of next larger size.

Drills 1 3/32 in. to 3 in. have shanks 1 3/4 inches diameter by 6 inches long.

Designed for enlarging cored, punched or drilled holes. Will not drill solid metal.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Four Groove Twist Drills—Taper Shank



No. 102C Carbon Steel
No. 402C "Diamond" High Speed

Diameter Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.	Shank Taper	Diameter Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.	Shank Taper
	Carbon Steel	High Speed					Carbon Steel	High Speed			
1/4	\$1.00	\$2.00	6 1/8	3	No. 1	1 3/8	\$6.50	\$17.00	14 1/2	8 7/8	No. 4
9/32	1.05	2.15	6 1/4	3 1/16		1 13/32	7.00	17.75	14 5/8	9	
5/16	1.10	2.25	6 3/8	3 1/8		1 7/16	7.50	18.50	14 3/4	9 1/8	
11/32	1.15	2.40	6 1/2	3 5/16		1 15/32	8.00	19.25	14 7/8	9 1/4	
3/8	1.20	2.50	6 3/4	3 9/16		1 1/2	8.50	20.00	15	9 3/8	
13/32	1.25	2.65	7	3 13/16		1 11/16	9.00	20.75	15 1/8	9 1/2	
7/16	1.30	2.75	7 1/4	4 1/16		1 9/16	9.50	21.50	15 1/4	9 5/8	
15/32	1.40	2.90	7 1/2	4 5/8		1 3/2	10.00	22.25	15 3/8	9 3/4	
1/2	1.50	3.00	7 3/4	4 5/8		1 5/8	10.50	23.00	15 1/2	9 7/8	
17/32	1.60	3.15	8	4 7/8		1 3/2	11.00	23.75	15 5/8	10	
9/16	1.70	3.25	8 1/4	5 1/8		1 11/16	11.50	24.50	15 3/4	10 1/8	
						1 5/8	12.00	25.50	15 7/8	10 1/4	
19/32	1.80	3.50	8 1/2	4 7/8		1 3/4	12.50	26.50	16	10 1/4	
5/8	1.90	3.75	8 3/4	5 1/16		1 5/8	13.25	27.50	16 1/8	10 1/4	
21/32	2.00	4.00	9	5 5/16		1 11/16	14.00	28.50	16 1/4	10 3/8	
11/16	2.10	4.25	9 1/4	5 1/2		1 2/2	14.75	29.50	16 3/8	10 1/2	
123/32	2.25	4.65	9 1/2	5 3/4	1 7/8	15.50	30.50	16 1/2	10 9/16		
3/4	2.40	5.00	9 3/4	6	1 3/2	16.25	31.50	16 1/2	10 11/16		
25/32	2.55	5.40	9 7/8	6 3/16	1 15/16	17.00	32.50	16 1/2	10 9/16		
13/16	2.70	5.75	10	6 5/16	1 3/2	17.75	33.50	16 1/2	10 9/16		
127/32	2.85	6.15	10 1/4	6 9/16	2	18.50	34.50	16 1/2	10 9/16		
7/8	3.00	6.50	10 1/2	6 13/16							
29/32	3.15	7.00	10 5/8	6 15/16							
					No. 2	2 1/32	19.25	36.00	16 1/2	9 1/2	No. 5
15/16	3.30	7.50	10 3/4	6 1/4		2 1/16	20.00	37.50	17	10 1/16	
31/32	3.45	8.00	10 7/8	6 3/8		2 1/8	21.50	40.50	17	10 1/16	
1	3.60	8.50	11	6 1/2		2 3/16	23.00	43.75	17	10 1/16	
1 1/32	3.75	9.00	11 1/8	6 5/8		2 1/4	24.50	47.50	17 1/2	10 9/16	
1 1/16	4.00	9.50	11 1/4	6 3/4		2 5/16	26.00	52.50	17 1/2	10 9/16	
1 3/32	4.25	10.25	11 1/2	7		2 3/8	27.50	60.00	18	10 7/8	
1 1/8	4.50	11.00	11 3/4	7 1/4		2 7/16	29.00	65.00	18 1/2	11 3/8	
1 5/32	4.75	11.75	11 7/8	7 3/8		2 1/2	30.50	70.00	19	11 7/8	
1 1/16	5.00	12.50	12	7 1/2		2 9/16	32.00	76.25	19 1/4	12 1/8	
1 7/32	5.25	13.25	12 1/8	7 5/8		2 11/16	34.00	82.50	19 1/2	12 3/8	
1 1/4	5.50	14.00	12 1/2	8		2 3/4	36.00	88.75	20	12 7/8	
						2 13/16	38.00	95.00	20 1/2	13 1/4	
						2 1/2	40.50	102.50	20 1/2	13 1/4	
1 9/32	5.75	14.75	14 1/8	8 1/2		2 7/8	43.00	110.00	21	13 3/4	
1 1/16	6.00	15.50	14 1/4	8 5/8		2 15/16	45.50	117.50	21	13 3/4	
1 1/32	6.25	16.25	14 3/8	8 3/4	3	48.00	125.00	22	14 5/8		

Thirty-second sizes not listed take list midway between sixteenth sizes. Sixty-fourth sizes furnished at list of next larger size.

Designed for enlarging cored, punched or drilled holes. Will not drill solid metal.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

Four Groove Twist Drills

STRAIGHT SHANK



No. 104C Carbon Steel

No. 404C "Diamond" High Speed

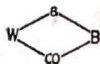
Diameter Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.	Diameter Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.
	Carbon Steel	High Speed				Carbon Steel	High Speed		
1/4	\$1.00	\$2.00	6 1/8	4 1/8	1 3/32	\$7.00	\$17.75	14 5/8	9 1/2
9/32	1.05	2.15	6 1/4	4 1/8	1 7/16	7.50	18.50	14 3/4	9 5/8
5/8	1.10	2.25	6 3/8	4 1/8	1 1/2	8.00	19.25	14 7/8	9 3/4
1 1/16	1.15	2.40	6 1/2	4 1/4	1 1/2	8.50	20.00	15	9 7/8
1 1/8	1.20	2.50	6 3/4	4 1/4	1 3/4	9.00	20.75	15 1/8	10
1 1/4	1.25	2.65	7	4 3/8	1 9/16	9.50	21.50	15 1/4	10 1/8
1 1/2	1.30	2.75	7 1/4	4 5/8	1 1/2	10.00	22.25	15 3/8	10 1/4
1 5/8	1.40	2.90	7 1/2	4 7/8	1 5/8	10.50	23.00	15 1/2	10 3/8
1 3/4	1.50	3.00	7 3/4	5	1 3/4	11.00	23.75	15 5/8	10 1/2
1 7/8	1.60	3.15	8	5 1/4	1 11/16	11.50	24.50	15 3/4	10 5/8
2	1.70	3.25	8 1/4	5 3/8	1 1/2	12.00	25.50	15 7/8	10 3/4
2 1/16	1.80	3.50	8 1/2	5 5/8	1 3/4	12.50	26.50	16	10 7/8
2 1/8	1.90	3.75	8 3/4	5 3/4	1 5/8	13.25	27.50	16 1/8	10 1/8
2 1/4	2.00	4.00	9	5 7/8	1 3/2	14.00	28.50	16 1/4	10 1/4
2 1/2	2.10	4.25	9 1/4	6	1 7/8	14.75	29.50	16 3/8	10 5/8
2 3/8	2.25	4.65	9 1/2	6 3/16	1 3/2	15.50	30.50	16 1/2	10 1/2
2 1/2	2.40	5.00	9 3/4	6 3/8	1 29/32	16.25	31.50	16 1/2	10 1/2
2 5/8	2.55	5.40	9 7/8	6 1/2	1 15/16	17.00	32.50	16 1/2	10 1/2
2 3/4	2.70	5.75	10	6 5/8	1 31/32	17.75	33.50	16 1/2	10 1/2
2 7/8	2.85	6.15	10 1/4	6 3/4	2	18.50	34.50	16 1/2	10 1/2
3	3.00	6.50	10 1/2	7	2 1/32	19.25	36.00	16 1/2	9 7/8
3 1/16	3.15	7.00	10 5/8	7	2 1/16	20.00	37.50	17	10 3/8
3 1/8	3.30	7.50	10 3/4	7	2 1/8	21.50	40.50	17	10 3/8
3 1/4	3.45	8.00	10 7/8	7 1/8	2 1/8	23.00	43.75	17	10 3/8
3 1/2	3.60	8.50	11	7 3/16	2 1/4	24.50	47.50	17 1/2	10 7/8
3 3/4	3.75	9.00	11 1/8	7 5/16	2 5/16	26.00	52.50	17 1/2	10 7/8
4	4.00	9.50	11 1/4	7 3/8	2 3/8	27.50	60.00	18	11 3/8
4 1/16	4.25	10.25	11 1/2	7 5/8	2 7/16	29.00	65.00	18 1/2	11 7/8
4 1/8	4.50	11.00	11 3/4	7 7/8	2 1/2	30.50	70.00	19	12 3/8
4 1/4	4.75	11.75	11 7/8	8	2 9/16	32.00	76.25	19 1/4	12 5/8
4 1/2	5.00	12.50	12	8 1/8	2 5/8	34.00	82.50	19 1/2	12 7/8
4 3/4	5.25	13.25	12 1/8	8 1/8	2 11/16	36.00	88.75	20	13 3/8
5	5.50	14.00	12 1/2	8 1/2	2 3/4	38.00	95.00	20 1/2	13 7/8
5 1/16	5.75	14.75	14 1/8	9 1/8	2 13/16	40.50	102.50	20 1/2	13 7/8
5 1/8	6.00	15.50	14 1/4	9 1/4	2 7/8	43.00	110.00	21	14 3/8
5 1/4	6.25	16.25	14 3/8	9 3/8	2 15/16	45.50	117.50	21	14 3/8
5 1/2	6.50	17.00	14 1/2	9 1/2	3	48.00	125.00	22	15 3/8

Thirty-second sizes not listed take list midway between sixteenth sizes. Sixty-fourth sizes furnished at list of next larger size.

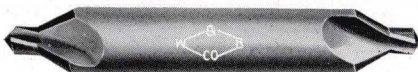
Drills 1 1/2 in. to 3 in. have shanks 1 3/4 inches diameter by 6 inches long.

Designed for enlarging cored, punched or drilled holes. Will not drill solid metal.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Drill and Countersink Combined



No. 114 Carbon Steel

Size	PRICE PER DOZEN		Diameter of Body Ins.	Diameter of Drill Ins.	Length Over All Ins.	Length Over Drill Ins.
	Carbon Steel					
AA	\$2.00		$\frac{1}{8}$	57 and 57	$2\frac{1}{8}$	$\frac{3}{32}$
E	2.25		$\frac{1}{16}$	$\frac{1}{16}$ and 45	$2\frac{1}{8}$	$\frac{3}{32}$
EA	2.25		$\frac{3}{16}$	$\frac{1}{16}$ and $\frac{1}{16}$	$2\frac{1}{8}$	$\frac{3}{32}$
EB	2.25		$\frac{1}{8}$	55 and 55	$2\frac{1}{8}$	$\frac{3}{32}$
D	2.50		$\frac{5}{16}$	49 and 45	$2\frac{1}{8}$	$\frac{3}{32}$
DA	2.50		$\frac{3}{8}$	46 and 46	$2\frac{1}{8}$	$\frac{3}{32}$
A	2.75		$\frac{7}{16}$	$\frac{3}{32}$ and $\frac{1}{8}$	$2\frac{1}{8}$	$\frac{5}{32}$
B	2.75		$\frac{1}{2}$	$\frac{1}{8}$ and $\frac{1}{8}$	$2\frac{1}{8}$	$\frac{5}{32}$
C	2.75		$\frac{3}{8}$	$\frac{3}{8}$ and $\frac{3}{8}$	$2\frac{1}{8}$	$\frac{5}{32}$
CA	2.75		$\frac{1}{2}$	30 and 30	$2\frac{1}{8}$	$\frac{5}{32}$
F	3.50		$\frac{7}{16}$	$\frac{5}{32}$ and $\frac{5}{32}$	$2\frac{1}{8}$	$\frac{7}{32}$
G	3.50		$\frac{1}{2}$	$\frac{3}{16}$ and $\frac{3}{16}$	$2\frac{1}{8}$	$\frac{7}{32}$
H	3.50		$\frac{1}{2}$	$\frac{5}{16}$ and $\frac{5}{16}$	$2\frac{1}{8}$	$\frac{7}{32}$
I	4.60		$1\frac{1}{2}$	$\frac{3}{16}$ and $\frac{7}{32}$	$3\frac{1}{4}$	$\frac{7}{32}$
J	4.60		$1\frac{1}{2}$	$\frac{7}{32}$ and $1\frac{1}{4}$	$3\frac{1}{4}$	$\frac{9}{32}$
K	4.60		$1\frac{1}{2}$	$\frac{7}{32}$ and $\frac{9}{32}$	$3\frac{1}{4}$	$\frac{9}{32}$
L	4.60		$1\frac{1}{2}$	$\frac{9}{32}$ and $\frac{7}{32}$	$3\frac{1}{4}$	$\frac{7}{32}$
M	4.60		$1\frac{1}{2}$	$\frac{9}{32}$ and $\frac{9}{32}$	$3\frac{1}{4}$	$\frac{7}{32}$
N	5.00		$1\frac{1}{2}$	$1\frac{1}{2}$ and $1\frac{1}{2}$	$3\frac{1}{4}$	$\frac{11}{32}$
O	5.00		$1\frac{1}{2}$	$1\frac{1}{2}$ and $1\frac{1}{2}$	$3\frac{1}{4}$	$\frac{11}{32}$

The angle of Countersink is 60°. Special sizes and angles made to order.
Packed one dozen of a size in a box.

Drill and Countersink Combined with Taper Shank



No. 114A

Size	Price Each	Diameter of Body Ins.	Diameter of Drill Ins.	Shank Taper	Length Over All Ins.	Length of Drill Ins.
P	\$0.75	$\frac{7}{16}$	$\frac{1}{16}$	No. 1	$4\frac{3}{16}$	$\frac{3}{32}$
Q	.75	$\frac{7}{16}$	$\frac{3}{32}$	No. 1	$4\frac{3}{16}$	$\frac{5}{32}$
R	.75	$\frac{7}{16}$	$\frac{1}{8}$	No. 1	$4\frac{3}{16}$	$\frac{5}{32}$
S	.75	$\frac{7}{16}$	$\frac{5}{32}$	No. 1	$4\frac{3}{16}$	$\frac{7}{32}$
T	.75	$\frac{7}{16}$	$\frac{3}{16}$	No. 1	$4\frac{3}{16}$	$\frac{7}{32}$
U	.75	$\frac{7}{16}$	No. 22	No. 1	$4\frac{3}{16}$	$\frac{7}{32}$
V	.75	$\frac{7}{16}$	No. 13	No. 1	$4\frac{3}{16}$	$\frac{7}{32}$

The angle of Countersink is 60°. Special sizes and angles made to order.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Drill and Countersink Combined Fitting Blacksmiths' Drill Presses



No. 114B Carbon Steel
No. 414B High Speed Steel

Size	PRICE PER DOZEN		Diameter of Body Ins.	Diameter of Drill Ins.	Length Over All Ins.	Length of Drill Ins.
	Carbon Steel	High Speed				
1	\$4.60	12.00	1/2	7/32	4 3/4	5/8
2	4.60	12.00	1/2	9/32	4 3/4	5/8
3	5.00	12.00	1/2	11/32	4 3/4	5/8
4	5.00	12.00	1/2	13/32	4 3/4	5/8
11	7.25	18.00	5/8	1/2	4 3/4	5/8
12	7.25	18.00	5/8	9/32	4 3/4	5/8
13	7.75	18.00	5/8	11/32	4 3/4	5/8
14	7.75	18.00	5/8	13/32	4 3/4	5/8

The Angle of Countersink is 60° Bodies flattened for set screw.

Specially designed for drilling and countersinking TIRES and WAGON IRONS AT ONE OPERATION.

Packed one dozen of a size in a box.

Bit Stock Countersink



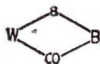
No. 109A

Diameter, Ins.	Length, Over All, Ins.	Price, Each
3/8	4 1/4	\$0.50
1/2	4 1/4	.60
5/8	4 1/4	.75
3/4	5	.90
7/8	5	1.05
1	5	1.20

The included angle at point is 82°.

Special angles made to order.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Machine Countersinks

FITTING BLACKSMITHS' DRILL PRESSES



109F

Shank $\frac{1}{2}$ in. diameter by $2\frac{1}{4}$ in. long

No. 109G

Shank .648 diameter ($\frac{11}{16}$ in.) by $2\frac{1}{4}$ in. long.

Diameter Ins.	Price Per Dozen	Diameter Ins.	Price Per Dozen
$\frac{1}{2}$	\$7.25	$\frac{1}{2}$	\$7.25
$\frac{9}{16}$	8.70	$\frac{9}{16}$	8.70
$\frac{5}{8}$	9.35	$\frac{5}{8}$	9.35
$\frac{3}{4}$	12.25	$\frac{3}{4}$	12.25
$\frac{7}{8}$	14.00	$\frac{7}{8}$	14.00
1	15.75	1	15.75

The included angle at point is 60°.

Will furnish 80° angle when specified.

The included angle of point for machine and wood screws is 82° and tire bolts 60°.

Unless otherwise specified, will always furnish 60° and shanks $\frac{1}{2}$ inch in diameter.

Five Flute Countersink



TAPER SHANK

No. 102F Carbon Steel

No. 402F "Diamond" High Speed



STRAIGHT SHANK

No. 104F Carbon Steel

No. 404F "Diamond" High Speed

These Countersinks are used on Plow Shares, Cultivator Shovels, Drill Points and other steel shapes, where the bolt holes are punched square, or for key head bolts and it is necessary to countersink to let the round head of the bolt in flush.

Prices quoted on application.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Straight Shank Twist Drills

(FOR WOOD)



No. 113

Diameter Ins.	Price Per Doz.	Length Over All Ins.	Length of Twist Ins.
1/16	\$1.60	2 1/2	1 1/4
3/32	1.70	2 3/4	1 1/2
1/8	1.80	3	1 3/4
5/32	1.90	3 1/4	2 3/8
3/16	2.25	3 1/2	2 1/2
7/32	2.75	3 3/4	2 3/4
1/4	3.25	4	2 3/4
9/32	3.80	4 1/4	2 3/4
5/16	4.35	4 1/2	3 1/8
11/32	5.05	4 3/4	3 1/8
3/8	6.00	5	3 5/8
13/32	7.00	5 1/4	3 3/4
7/16	8.50	5 1/2	4 1/8
15/32	10.00	5 3/4	4 3/8
1/2	12.00	6	4 1/2
17/32	12.50	6	4 1/2
9/16	13.00	6	4 1/2
19/32	13.50	6	4 1/2
5/8	14.00	6	4 1/2

Prentice Machine Bits

(FOR WOOD)



No. 108C

Diameter Ins.	Price Each	Length Over All Ins.	Length of Twist Ins.	Diameter Ins.	Price Each	Length Over All Ins.	Length of Twist Ins.
1/8	\$0.50	5 1/8	2	2 1/2	\$1.90	9 1/2	6 1/2
3/16	.55	5 3/8	2 1/4	3/4	2.00	9 3/4	6 3/4
1/4	.60	5 5/8	2 1/2	1 1/4	2.10	9 7/8	6 7/8
5/16	.65	5 7/8	2 3/4	1 1/2	2.20	10	7
3/8	.70	6 1/4	3 1/8	1 3/4	2.40	10 1/4	7 1/4
7/16	.75	6 1/2	3 3/8	2	2.60	10 1/2	7 1/8
1/2	.80	6 3/8	3 1/2	2 1/4	2.80	10 5/8	7 1/4
5/8	.85	6 1/2	3 5/8	2 1/2	3.00	10 3/4	7 1/8
3/4	.90	6 3/4	3 3/4	2 3/4	3.25	10 7/8	7 1/8
7/8	.95	7	4 1/8	3	3.50	11	7 1/8
1	1.00	7 1/4	4 1/4	3 1/4	4.00	11 1/4	8 1/8
1 1/16	1.10	7 1/2	4 1/2	3 1/2	4.50	11 3/4	8 5/8
1 1/8	1.20	7 3/4	4 3/4	3 3/4	5.00	12	8 7/8
1 1/4	1.30	8	4 5/8	4	5.50	12 1/2	9 3/8
1 1/2	1.40	8 1/4	4 3/4	4 1/4	6.00	12 1/2	9 3/8
1 3/8	1.50	8 1/2	4 7/8	4 1/2	6.50	12 1/2	9 3/8
1 1/2	1.60	8 3/4	5	4 3/4	7.50	12 1/2	9 3/8
1 5/8	1.70	9	5 1/4	5	8.50	12 1/2	9 3/8
1 3/4	1.80	9 1/4	5 1/2	5 1/4			

Shanks 1/2 x 2 1/2 inches. Furnished with shank not slabbed, when so specified. Will fit blacksmith's drill presses.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Taper Shank Machine Bits (FOR WOOD)



No. 108B

Diameter Ins.	Price Each	Length Over All Ins.	Length of Twist Ins.	Shank Taper	Diameter Ins.	Price Each	Length Over All Ins.	Length of Twist Ins.	Shank Taper			
1/8	\$0.50	5 1/8	2 1/8	No. 1	3/32	\$1.90	9 1/2	5 3/4	No. 2			
3/16	.55	5 3/8	2 3/8		1/4	2.00	9 3/4	6				
1/4	.60	5 5/8	2 1/2		5/16	2.10	9 7/8	6 3/16				
5/16	.65	5 7/8	2 1/2		3/8	2.20	10	6 3/8				
3/8	.70	6 1/8	3		7/16	2.40	10 1/4	6 3/4				
7/16	.75	6 3/4	3 1/16		1/2	2.60	10 1/2	6 15/16				
1/2	.80	6 3/8	3 1/8		5/8	2.80	10 5/8	6 15/8				
5/8	.85	6 1/2	3 1/8		3/4	No. 3	3.00	10 3/4		6 1/4		
3/4	.90	6 3/4	3 1/8		7/8							
7/8	.95	7	3 1/8		1							
1	1.00	7 1/4	4 1/16	1 1/16								
1 1/16	1.10	7 1/2	4 3/8	1 1/8								
1 1/8	1.20	7 3/4	4 5/8	1 1/4								
1 1/4	1.30	8	4 7/8	1 3/8								
1 1/2	1.40	8 1/4	5 1/8	1 1/2								
1 3/8	1.50	8 1/2	4 7/8	No. 2	1 5/8				6.00		14 1/4	8 5/8
1 1/2	1.60	8 3/4	5 1/8		1 3/8				6.50		14 1/2	8 7/8
1 5/8	1.70	9	6 1/8		1 1/2	7.50	14 3/4	9 1/8				
1 3/4	1.80	9 1/4	5 1/2		1 1/2	8.50	15	9 3/8				

Straight Shank Machine Bits (FOR WOOD)



No. 108

Diameter Ins.	Price Each	Length Over All Ins.	Length of Twist Ins.	Diameter Ins.	Price Each	Length Over All Ins.	Length of Twist Ins.
1/8	\$0.40	3	1 1/8	3/32	\$1.80	7 1/4	5 1/2
3/16	.45	3 1/4	2 3/32	1/4	1.90	7 1/2	5 1/2
1/4	.50	3 1/2	2 1/16	5/16	2.00	7 3/4	5 7/8
5/16	.55	3 3/4	2 1/8	3/8	2.10	8	6 1/16
3/8	.60	4	2 3/4	7/16	2.30	8 1/4	6 1/4
7/16	.65	4 1/4	2 3/4	1/2	2.50	8 1/2	6 1/8
1/2	.70	4 1/2	3 1/16	5/8	2.70	8 3/4	6 5/8
5/8	.75	4 3/4	3 1/8	3/4	2.90	9	6 1/2
3/4	.80	5	3 5/8	7/8	3.00	9 1/4	7
7/8	.85	5 1/4	3 3/4	1	3.25	9 1/2	7 3/8
1	.90	5 1/2	4 1/16	1 1/16	3.75	11 1/4	8 1/2
1 1/16	1.00	5 3/4	4 3/32	1 1/8	4.25	11 3/4	8 7/8
1 1/8	1.10	6	4 1/2	1 1/4	4.75	12	9
1 1/4	1.20	6 1/8	4 1/2	1 1/2	5.25	12 1/4	9 3/8
1 1/2	1.30	6 1/4	4 11/16	1 5/8	5.75	12 1/2	9 5/8
1 3/8	1.40	6 3/8	4 3/4	1 3/4	6.25	12 1/2	9 3/8
1 5/8	1.50	6 1/2	4 7/8	1 7/8	7.25	12 1/2	9 3/8
1 3/4	1.60	6 3/4	5	1 1/2	8.25	12 1/2	9 3/8
1 7/8	1.70	7	5 1/8				

ALWAYS GIVE LIST NUMBER WHEN ORDERING

Wood Boring Brace Drills



No. 109B

No.	Price Per Dozen	Length Over All Ins.	No.	Price Per Dozen	Length Over All Ins.
2	\$3.25	3 $\frac{1}{2}$	18	\$11.00	8 $\frac{7}{8}$
3	3.25	3 $\frac{3}{4}$	19	11.75	9 $\frac{1}{8}$
4	3.25	4 $\frac{1}{4}$	20	12.50	9 $\frac{3}{8}$
5	3.50	4 $\frac{3}{8}$	22	14.50	9 $\frac{5}{8}$
6	4.00	5 $\frac{1}{2}$	24	16.50	9 $\frac{7}{8}$
7	4.50	6 $\frac{1}{8}$	26	18.50	9 $\frac{7}{8}$
8	5.00	6 $\frac{3}{8}$	28	21.00	9 $\frac{7}{8}$
9	5.50	7 $\frac{1}{8}$	30	24.00	9 $\frac{7}{8}$
10	6.00	7 $\frac{3}{8}$	32	27.00	9 $\frac{7}{8}$
11	6.50	7 $\frac{5}{8}$	34	30.00	9 $\frac{7}{8}$
12	7.00	7 $\frac{7}{8}$	36	33.00	9 $\frac{7}{8}$
13	7.50	8 $\frac{1}{8}$	38	37.00	9 $\frac{7}{8}$
14	8.00	8 $\frac{3}{8}$	40	41.00	9 $\frac{7}{8}$
15	8.75	8 $\frac{5}{8}$	42	45.00	9 $\frac{7}{8}$
16	9.50	8 $\frac{7}{8}$	44	50.00	9 $\frac{7}{8}$
17	10.25	8 $\frac{7}{8}$			

The numbers indicate the sizes in thirty-seconds. Intermediate sizes furnished at price of next larger number.

Packed: Sizes Nos. 2 to 19, one dozen; Nos. 20 to 32, one-half dozen of a size in a box.

For Wood Boring Brace Drills in Sets, see page 37.

Extra Length Wood Boring Brace Drills



No. 109C

Bell Hangers and Electricians Bits

No.	12 Inch Per Doz.	18 Inch Per Doz.	24 Inch Per Doz.	30 Inch Per Doz.	36 Inch Per Doz.
6	\$ 7.50	\$10.00	\$12.50	\$15.00	\$17.50
8	8.00	10.50	13.00	15.50	18.00
10	8.75	11.00	13.50	16.00	18.50
12	9.50	12.00	14.50	17.00	19.50
14	10.50	13.00	15.50	18.00	20.50
16	12.00	14.50	17.00	19.50	22.00
18	13.50	16.00	18.50	21.00	23.50
20	15.25	17.75	20.25	22.75	25.25
22	17.00	19.50	22.00	24.50	27.00
24	19.00	21.50	24.00	26.50	29.00
26	21.00	23.50	26.00	28.50	31.00
28	23.00	25.50	28.00	30.50	33.00
30	25.00	27.50	30.00	32.50	35.00
32	27.50	30.00	32.50	35.50	38.00
34	30.50	33.00	35.50	39.00	42.00
36	33.00	36.00	39.00	42.50	47.00

The Numbers indicate the sizes in 32nds.

Packed: Sizes No. 24 and smaller, one-half dozen; Nos. 26 and 28, one-third dozen; Nos. 30 and 32, one-sixth dozen of a size in a box.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Bit Stock Drills

FOR METAL OR WOOD

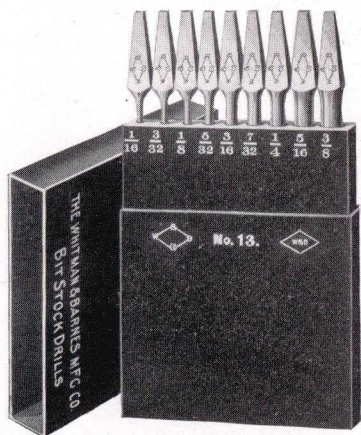


No. 109

Diam. Ins.	Price Per Doz.	Length Over All Ins.	Diam. Ins.	Price Per Doz.	Length Over All Ins.
$\frac{1}{16}$	\$2.50	$3\frac{1}{2}$	$\frac{1}{2}$	\$13.00	7
$\frac{3}{16}$	2.60	$3\frac{1}{2}$	$\frac{1}{4}$	14.25	$7\frac{1}{4}$
$\frac{3}{8}$	2.70	$3\frac{3}{4}$	$\frac{9}{16}$	15.50	$7\frac{1}{2}$
$\frac{1}{4}$	2.85	4	$\frac{19}{32}$	16.75	$7\frac{1}{2}$
$\frac{1}{8}$	3.00	4	$\frac{5}{8}$	18.00	$7\frac{1}{2}$
$\frac{9}{64}$	3.25	$4\frac{1}{4}$	$\frac{21}{32}$	19.50	$7\frac{1}{2}$
$\frac{5}{32}$	3.50	$4\frac{1}{4}$	$\frac{11}{16}$	21.00	$7\frac{1}{2}$
$\frac{11}{64}$	3.75	$4\frac{1}{2}$	$\frac{23}{32}$	22.50	$7\frac{1}{2}$
$\frac{3}{16}$	4.00	$4\frac{1}{2}$	$\frac{3}{4}$	24.00	$7\frac{1}{2}$
$\frac{13}{64}$	4.25	$4\frac{3}{4}$	$\frac{25}{32}$	25.50	$7\frac{1}{2}$
$\frac{7}{32}$	4.50	$4\frac{3}{4}$	$\frac{13}{16}$	27.00	$7\frac{1}{2}$
$\frac{15}{64}$	4.75	5	$\frac{27}{32}$	28.50	$7\frac{1}{2}$
$\frac{1}{4}$	5.00	5	$\frac{7}{8}$	30.00	$7\frac{1}{2}$
$\frac{17}{64}$	5.50	$5\frac{1}{4}$	$\frac{29}{32}$	31.50	$7\frac{1}{2}$
$\frac{9}{32}$	6.00	$5\frac{1}{4}$	$\frac{15}{16}$	33.00	$7\frac{1}{2}$
$\frac{19}{64}$	6.50	$5\frac{1}{2}$	$\frac{31}{32}$	34.50	$7\frac{1}{2}$
$\frac{5}{16}$	7.00	$5\frac{1}{2}$	1	36.00	$7\frac{1}{2}$
$\frac{21}{64}$	7.50	$5\frac{3}{4}$	$\frac{1}{16}$	39.00	$7\frac{1}{2}$
$\frac{11}{32}$	8.00	$5\frac{3}{4}$	$\frac{1}{8}$	42.00	$7\frac{1}{2}$
$\frac{3}{8}$	8.50	6	$\frac{3}{16}$	45.00	$7\frac{1}{2}$
$\frac{13}{32}$	9.25	$6\frac{1}{4}$	$\frac{1}{4}$	48.00	$7\frac{1}{2}$
$\frac{7}{16}$	10.50	$6\frac{1}{2}$			
$\frac{15}{32}$	11.75	$6\frac{3}{4}$			

Packed: Sizes $\frac{1}{16}$ to $\frac{9}{16}$ in., one dozen; $\frac{19}{32}$ to 1-in., one-half dozen of a size in a box.
For Bit Stock Drills In Sets see page 37.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



“W. & B.” Bit Stock Drill Sets

Packed in flat Leatherette Cases which fit the pocket and keep the Drills in good condition. Size of each Drill stamped on case in gold.

Set No. 13 Contains One Each—Price Per Set \$4.85

$\frac{1}{16}$	$\frac{3}{32}$	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{3}{16}$	$\frac{7}{32}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$
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Set No. 13A Contains One Each—Price Per Set \$4.35

$\frac{1}{8}$	$\frac{5}{32}$	$\frac{3}{16}$	$\frac{7}{32}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$
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Set No. 13B Contains One Each—Price Per Set \$6.40

$\frac{1}{8}$	$\frac{5}{32}$	$\frac{3}{16}$	$\frac{7}{32}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$
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“W. & B.” Wood Boring Brace Drill Sets

Packed in Flat, Black Leatherette Boxes.

Size of each Drill stamped on case in Gold.

Set No. 14 Contains One Each—

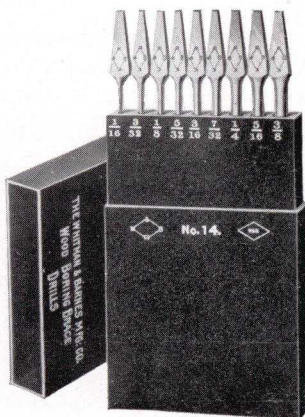
$\frac{1}{16}$	$\frac{3}{32}$	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{3}{16}$	$\frac{7}{32}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$
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Price Per Set \$4.50

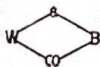
Set No. 14A Contains One Each—

$\frac{1}{8}$	$\frac{5}{32}$	$\frac{3}{16}$	$\frac{7}{32}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$
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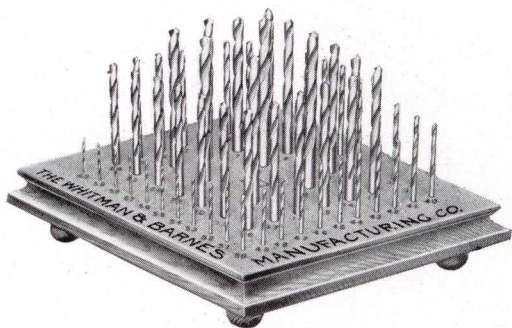
Price Per Set \$3.70



ALWAYS GIVE LIST NUMBER WHEN ORDERING



"Diamond" Twist Drill Sets

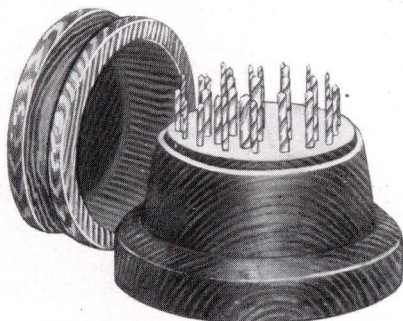


PRICES OF DRILLS PER SET

No. 1.	Set of Taper Shank Drills, $\frac{1}{4}$ to 1 inch, inclusive, varying by 16ths (see page 5)	\$22.40
No. 2.	Set of Taper Shank Drills, $\frac{3}{8}$ to $1\frac{1}{4}$ inch, inclusive, varying by 16ths (see pages 5 and 6)	40.10
No. 3.	Set of Taper Shank Drills, $\frac{3}{8}$ to $\frac{3}{4}$ inch, inclusive, by 32nds, $\frac{1}{2}$ to $1\frac{1}{4}$ inch, by 16ths (see pages 5 and 6)	48.50
No. 4.	Set of Taper Shank Drills, $\frac{3}{8}$ to $\frac{3}{4}$ inch, inclusive, by 32nds, $\frac{1}{2}$ to 2 inch, by 16ths (see pages 5 and 6)	186.00
No. 5.	Set Jobbers' Straight Shanks, $\frac{1}{8}$ to $\frac{1}{2}$ inch, inclusive, by 64ths, mounted (see page 13)	13.50
No. 6.	Set Jobbers' Straight Shanks, $\frac{1}{8}$ to $\frac{1}{2}$ inch, inclusive, by 32nds, mounted (see page 13)	8.00
No. 7.	Set of Drills, Nos. 1 to 60, inclusive, Wire Gauge, and $\frac{1}{4}$ to $\frac{3}{8}$ inch by 32nds, inclusive, Jobbers (see pages 13 and 15)	14.50
No. 8.	Set Drills, Steel Wire Gauge, from No. 1 to No. 60 Wire Gauge, inclusive, mounted (see page 15)	12.50
No. 9.	Half Set Drills, alternate Nos. 1 to 59, Wire Gauge, inclusive, mounted (see page 15)	7.00
No. 12.	Set Machine Bits, $\frac{1}{8}$ inch to $\frac{1}{2}$ inch, inclusive, varying by 32nds, mounted (see page 34)	10.50
	Price of Diamond Wood Block only	Each 2.00

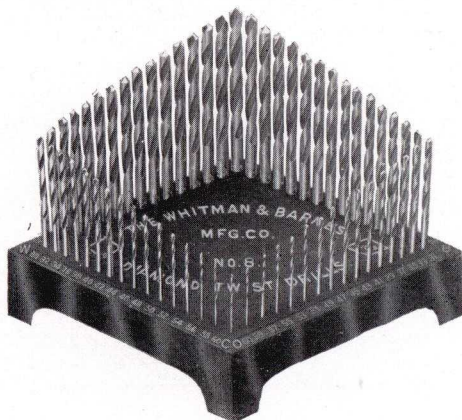
ALWAYS GIVE LIST NUMBER WHEN ORDERING

Jewelers' Set



No. 10. Case and Drills No. 30 ($\frac{1}{8}$ inch) to No. 65 Steel Wire Gauge.
Price, per set, \$8.00. Case only, each \$2.00.

"Diamond" Twist Drill Sets



Mounted on handsome metal stands, copperized finish. Each Drill fits in a hole of corresponding size, in the stand. On the 5A Stand, the 32nd sizes are on one side and the 64th sizes on the other.

On the 8A Stand the even numbers are on one side and the odd numbers on the other.

No. 5A Set contains Jobbers' Drills, $\frac{1}{16}$ in. to $\frac{1}{2}$ in., by 64ths.
Price, Per Set, \$15.00.

No. 8A Set contains Wire Drills, Nos. 1 to 60, inclusive.
Price, Per Set, \$13.25.

Metal Stands only, Price, Each, \$2.40.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Straight Fluted Drills

(FARMER DRILLS)



JOBBER'S LENGTH

No. 105A Carbon Steel

No. 405A "Diamond" High Speed

Dimensions, List Prices and Packing same as No. 105 and No. 405, page 13.



No. 107A Wire Gauge Carbon Steel

No. 407A Wire Gauge "Diamond" High Speed

Dimensions, List Prices and Packing same as No. 107 and No. 407, pages 15 and 16.

These drills are especially adapted for work in brass, copper, and other soft metals, as they will not run ahead nor "hog in."



TAPER SHANK

No. 102A Carbon Steel

No. 402A "Diamond" High Speed

Dimensions and List Prices same as No. 102 and No. 402, pages 5, 6, 7 and 8.



STRAIGHT SHANK, TAPER LENGTH

No. 104A Carbon Steel

No. 404A "Diamond" High Speed

Dimensions and List Prices same as No. 104 and No. 404, pages 10, 11 and 12.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Left Hand Drills

WITH TAPER SHANK



Same List and Dimensions as Right Hand Drills, pages 5, 6, 7 and 8, but special discount.

WITH STRAIGHT SHANK



Same List and Dimensions as Right Hand Drills, pages 10, 11 and 12, but special discount.

Single Twist Drills

FOR WOOD



- No. 108E Taper Shank
- No. 108D Straight Shank
- No. 108F Jobbers'
- No. 108G Wire

Furnished with any shank desired and in any style or size.
Specially adapted for use in the manufacture of Shovel Handles, Wheelbarrows, etc.

List Prices same as on pages 5, 6, 7, 8, 9, 10, 11, 12, 15 and 16.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Millimeter Size Twist Drills—Taper Shank



No. 102E Carbon Steel

Diameter M. M.	Price Each	Diameter in Decimals of 1 inch	Length M. M.	Length of Twist M. M.	Shank Taper	Diameter M. M.	Price Each	Diameter in Decimals of 1 inch	Length M. M.	Length of Twist M. M.	Shank Taper	
3.	\$0.45	.1181	116	43	No. 1	21	\$2.40	.8267	260	163	No. 2	
3.5	.45	.1378	119	46		21.5	2.60	.8464	267	170		
4	.50	.1575	124	51		22	2.60	.8661	267	170		
4.5	.50	.1771	129	56		22.5	2.80	.8858	270	173		
5	.55	.1968	146	71		23	2.80	.9055	270	173		
5.5	.55	.2165	152	76		No. 3	23.5	3.00	.9252	273		159
6	.60	.2362	155	76			24	3.25	.9449	273		159
6.5	.65	.2559	159	79			24.5	3.25	.9646	276		162
7	.65	.2756	159	79			25	3.50	.9843	279		165
7.5	.70	.2953	162	78			25.5	3.75	1.0039	282		168
8	.75	.3149	162	78			26	3.75	1.0236	282		168
8.5	.75	.3346	165	81			26.5	4.00	1.0433	286		172
9	.80	.3543	165	81			27	4.25	1.0629	286		172
9.5	.80	.3740	172	87			27.5	4.25	1.0827	292		178
10	.90	.3937	178	94	28		4.50	1.1024	292	178		
10.5	1.00	.4134	184	100	28.5		4.50	1.1220	298	184		
11	1.00	.4330	184	100	29		4.75	1.1417	302	187		
11.5	1.10	.4527	191	107	29.5		5.00	1.1614	305	190		
12	1.20	.4724	191	107	30		5.00	1.1811	305	190		
12.5	1.20	.4921	197	113	30.5	5.25	1.2008	308	194			
13	1.30	.5118	197	113	31	5.50	1.2205	308	194			
13.5	1.40	.5315	203	119	31.5	5.50	1.2401	317	203			
14	1.40	.5512	210	125	32	5.75	1.2598	317	203			
14.5	1.50	.5708	216	132	No. 2	32.5	5.75	1.2795	359	219	No. 4	
15	1.50	.5905	216	119		33	6.00	1.2992	362	222		
15.5	1.60	.6102	222	125		33.5	6.25	1.3190	362	222		
16	1.70	.6299	222	125		34	6.25	1.3386	365	225		
16.5	1.70	.6496	229	132		34.5	6.50	1.3583	365	225		
17	1.80	.6693	229	132		35	7.00	1.3779	368	229		
17.5	1.90	.6890	241	144		35.5	7.00	1.3977	372	232		
18	1.90	.7086	241	144		36	7.50	1.4173	372	232		
18.5	2.00	.7283	247	151		36.5	7.50	1.4370	375	235		
19	2.00	.7480	247	151		37	8.00	1.4567	378	238		
19.5	2.10	.7677	251	154		37.5	8.50	1.4764	378	238		
20	2.20	.7874	251	154								
20.5	2.20	.8071	254	157								

Continued on next page

ALWAYS GIVE LIST NUMBER WHEN ORDERING

Millimeter Size Twist Drills

TAPER SHANK —(Continued)



No. 102E Carbon Steel

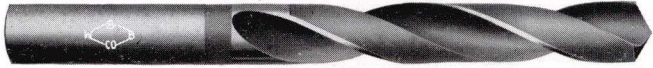
Diameter M. M.	Price Each.	Diameter in Decimals of 1 in.	Length M. M.	Length of Twist M. M.	Shank Taper	Diameter M. M.	Price Each.	Diameter in Decimals of 1 in.	Length M. M.	Length of Twist M. M.	Shank Taper
38	\$8.50	1.4961	381	241	No. 4	57	\$24.50	2.2441	445	260	No. 5
38.5	9.00	1.5157	381	241		57.5	25.25	2.2637	445	260	
39	9.50	1.5354	381	241		58	26.00	2.2835	445	260	
39.5	9.50	1.5551	387	248		58.5	26.00	2.3031	445	260	
40	10.00	1.5748	387	248		59	26.75	2.3228	445	260	
40.5	10.50	1.5945	387	248		59.5	26.75	2.3425	445	260	
41	10.50	1.6142	394	254		60	27.50	2.3622	457	269	
41.5	11.00	1.6338	394	254		60.5	28.25	2.3819	457	269	
42	11.00	1.6536	394	254		61	28.25	2.4015	457	269	
42.5	11.50	1.6733	400	260		61.5	29.00	2.4212	457	269	
43	12.00	1.6929	400	260		62	29.75	2.4409	470	283	
43.5	12.00	1.7126	400	260		62.5	29.75	2.4606	470	283	
44	12.50	1.7323	406	256		63	30.50	2.4803	483	292	
44.5	13.25	1.7519	406	256		63.5	30.50	2.5000	483	292	
45	13.25	1.7717	406	256		64	31.25	2.5197	483	292	
45.5	14.00	1.7914	406	256		64.5	32.00	2.5393	483	292	
46	14.00	1.8110	413	260		65	32.00	2.5591	489	298	
46.5	14.75	1.8307	413	260		65.5	33.00	2.5787	489	298	
47	15.50	1.8504	413	260		66	34.00	2.5984	495	302	
47.5	15.50	1.8701	419	267		66.5	34.00	2.6181	495	302	
48	16.25	1.8898	419	267	67	35.00	2.6378	495	302		
48.5	17.00	1.9094	419	267	67.5	36.00	2.6574	495	302		
49	17.00	1.9291	419	267	68	36.00	2.6772	508	314		
49.5	17.75	1.9488	419	264	68.5	37.00	2.6969	508	314		
50	17.75	1.9685	419	264	69	37.00	2.7165	521	324		
50.5	18.50	1.9882	419	264	69.5	38.00	2.7362	521	324		
					70	39.25	2.7559	521	324		
51	19.25	2.0079	419	244	70.5	39.25	2.7756	521	324		
51.5	19.25	2.0276	419	244	71	40.50	2.7952	521	324		
52	20.00	2.0473	432	257	71.5	41.75	2.8149	521	324		
52.5	20.75	2.0670	432	257	72	41.75	2.8347	521	324		
53	20.75	2.0866	432	257	72.5	43.00	2.8543	521	324		
53.5	21.50	2.1063	432	257	73	43.00	2.8740	533	333		
54	22.25	2.1259	432	257	73.5	44.25	2.8937	533	333		
54.5	22.25	2.1456	432	257	74	45.50	2.9134	533	333		
55	23.00	2.1654	432	257	74.5	45.50	2.9330	533	333		
55.5	23.00	2.1851	432	257	75	46.75	2.9527	533	333		
56	23.75	2.2047	432	257	75.5	48.00	2.9724	533	333		
56.5	24.50	2.2244	432	257	76	48.00	2.9921	559	355		

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Millimeter Size Twist Drills

STRAIGHT SHANK, TAPER LENGTH



No. 104E Carbon Steel

Diameter M. M.	Price Each	Diameter in Decimals of 1 inch	Length M. M.	Length of Twist M M	Diameter M. M.	Price Each	Diameter in Decimals of 1 inch	Length M. M.	Length of Twist M. M.
3	\$0.45	.1181	117	57	21.5	\$2.60	.8464	267	178
3.5	.45	.1378	133	70	22	2.60	.8661	267	178
4	.50	.1575	137	76	22 5	2.80	.8858	270	178
4.5	.50	.1771	140	83	23	2.80	.9055	270	178
5	.55	.1968	146	89	23 5	3.00	.9252	273	178
5.5	.55	.2165	152	102	24	3.25	.9449	273	178
6	.60	.2362	155	102	24.5	3.25	.9646	276	181
6.5	.65	.2559	155	102	25	3.50	.9842	279	182
7	.65	.2756	159	102	25.5	3.75	1.0039	282	186
7.5	.70	.2953	162	103	26	3.75	1.0236	282	186
8	.75	.3149	162	103	26 5	4.00	1.0433	286	187
8.5	.75	.3346	165	105	27	4.25	1.0629	286	187
9	.80	.3543	165	105	27.5	4.25	1.0827	292	194
9.5	.80	.3740	172	108	28	4.50	1.1024	292	194
10	.90	.3937	178	111	28 5	4.50	1.1220	298	200
10.5	1.00	.4134	184	117	29	4.75	1.1417	302	203
11	1.00	.4330	184	117	29 5	5.00	1.1614	305	206
11.5	1.10	.4527	191	124	30	5.00	1.1811	305	206
12	1.20	.4724	191	124	30.5	5.25	1.2008	308	206
12.5	1.20	.4921	197	127	31	5.50	1.2205	308	206
13	1.30	.5118	197	127	31.5	5.50	1.2401	317	216
13.5	1.40	.5315	203	133	32	5.75	1.2598	317	216
14	1.40	.5512	210	137	32.5	5.75	1.2795	359	232
14.5	1.50	.5708	216	143	33	6.00	1.2992	362	235
15	1.50	.5905	216	143	33 5	6.25	1.3190	362	235
15.5	1.60	.6102	222	146	34	6.25	1.3386	365	238
16	1.70	.6299	222	146	34 5	6.50	1.3583	365	238
16.5	1.70	.6496	229	149	35	7.00	1.3779	368	241
17	1.80	.6693	229	149	35.5	7.00	1.3977	372	241
17.5	1.90	.6890	241	157	36	7.50	1.4173	372	241
18	1.90	.7086	241	157	36 5	7.50	1.4370	375	244
18.5	2.00	.7283	247	162	37	8.00	1.4567	378	248
19	2.00	.7480	247	162	37 5	8.50	1.4764	378	248
19.5	2.10	.7677	251	165	38	8.50	1.4961	381	251
20	2.20	.7874	251	165	*38 5	9.00	1.5157	381	251
20.5	2.20	.8071	254	168	39	9.50	1.5354	381	251
21	2.40	.8267	260	171	39 5	9.50	1.5551	387	257

Continued on next page

Can be furnished with Two-Grooved Shanks if required.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

Millimeter Size Twist Drill

STRAIGHT SHANK TAPER LENGTH (Continued)



No. 104E Carbon Steel

Diam. M. M.	Price Each	Diameter in Decimals of 1 In.	Length M. M.	Length of Twist M. M.	Diam. M. M.	Price Each	Diameter in Decimals of 1 In.	Length M. M.	Length of Twist M. M.
40	\$10.00	1.5748	387	257	58.5	\$26.00	2.3031	445	293
40.5	10.50	1.5945	387	257	59	26.75	2.3228	445	293
41	10.50	1.6142	394	264	59.5	26.75	2.3425	445	293
41.5	11.00	1.6338	394	264	60	27.50	2.3622	457	305
42	11.00	1.6536	394	264	60.5	28.25	2.3819	457	305
42.5	11.50	1.6733	400	270	61	28.25	2.4015	457	305
43	12.00	1.6929	400	270	61.5	29.00	2.4212	457	305
43.5	12.00	1.7126	400	270	62	29.75	2.4409	470	318
44	12.50	1.7323	406	276	62.5	29.75	2.4606	470	318
44.5	13.25	1.7519	406	254	63	30.50	2.4803	483	331
45	13.25	1.7717	406	254	63.5	30.50	2.5000	483	331
45.5	14.00	1.7914	406	254	64	31.25	2.5197	483	331
46	14.00	1.8110	413	261	64.5	32.00	2.5393	483	331
46.5	14.75	1.8307	413	261	65	32.00	2.5591	489	337
47	15.50	1.8504	413	261	65.5	33.00	2.5787	489	337
47.5	15.50	1.8701	419	267	66	34.00	2.5984	495	343
48	16.25	1.8898	419	267	66.5	34.00	2.6181	495	343
48.5	17.00	1.9094	419	267	67	35.00	2.6378	495	343
49	17.00	1.9291	419	267	67.5	36.00	2.6574	495	343
49.5	17.75	1.9488	419	267	68	36.00	2.6772	508	356
50	17.75	1.9685	419	267	68.5	37.00	2.6969	508	356
50.5	18.50	1.9882	419	267	69	37.00	2.7165	521	369
51	19.25	2.0079	419	267	69.5	38.00	2.7362	521	369
51.5	19.25	2.0276	419	267	70	39.25	2.7559	521	369
52	20.00	2.0473	432	280	70.5	39.25	2.7756	521	369
52.5	20.75	2.0670	432	280	71	40.50	2.7952	521	369
53	20.75	2.0866	432	280	71.5	41.75	2.8149	521	369
53.5	21.50	2.1063	432	280	72	41.75	2.8347	521	369
54	22.25	2.1259	432	280	72.5	43.00	2.8543	521	369
54.5	22.25	2.1456	432	280	73	43.00	2.8740	533	381
55	23.00	2.1654	432	280	73.5	44.25	2.8937	533	381
55.5	23.00	2.1851	432	280	74	45.50	2.9134	533	381
56	23.75	2.2047	432	280	74.5	45.50	2.9330	533	381
56.5	24.50	2.2244	432	280	75	46.75	2.9527	533	381
57	24.50	2.2441	445	293	75.5	48.00	2.9724	533	381
57.5	25.25	2.2637	445	293	76	48.00	2.9921	559	407
58	26.00	2.2835	445	293	.....	.....	.....	....	....

Drills 44.5 to 76 M. M. diameter, have shanks 44.5 M. M. diameter by 152 M. M. long.
Can be furnished with Two-Grooved Shanks if required.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

**Millimeter Size Twist Drills**

STRAIGHT SHANK—SHORT SET OR JOBBERS' LENGTH

**No. 105E Carbon Steel**

Diameter M. M.	Price Per Dozen	Length Over All M. M.	Length of Twist M. M.	Diameter M. M.	Price Per Dozen	Length Over All M. M.	Length of Twist M. M.
.5	\$1.50	28	6	2.	\$1.65	57	30
.55	1.50	29	8	2.05	1.70	57	30
.6	1.50	30	9	2.1	1.70	58	31
.65	1.50	31	12	2.15	1.70	59	32
.7	1.50	32	13	2.2	1.70	60	33
.75	1.50	33	13	2.25	1.70	61	34
.8	1.50	34	13	2.3	1.70	62	35
.85	1.50	35	15	2.35	1.70	63	36
.9	1.50	36	16	2.4	1.70	64	36
.95	1.50	37	16	2.45	1.70	65	37
1.	1.50	38	17	2.5	1.70	66	37
1.05	1.55	39	17	2.6	1.75	66	37
1.1	1.55	40	18	2.7	1.75	67	38
1.15	1.55	41	18	2.75	1.75	68	39
1.2	1.55	42	19	2.8	1.75	68	39
1.25	1.55	43	20	2.9	1.75	69	40
1.3	1.60	44	21	3.	1.75	70	41
1.35	1.60	45	22	3.1	1.80	71	42
1.4	1.60	46	22	3.2	1.80	72	43
1.45	1.60	47	22	3.25	1.80	73	44
1.5	1.60	48	23	3.3	1.80	73	44
1.55	1.60	48	23	3.4	1.80	74	45
1.6	1.60	49	23	3.5	1.80	75	46
1.65	1.60	50	24	3.6	1.90	76	47
1.7	1.60	51	25	3.7	1.90	77	48
1.75	1.60	52	26	3.75	1.90	78	48
1.8	1.65	53	27	3.8	1.90	78	48
1.85	1.65	54	28	3.9	1.90	79	49
1.9	1.65	55	29	4	1.90	80	50
1.95	1.65	56	30				

Packed: Ten of a size in a package.

Continued on next page

Can be furnished with Two-Grooved Shanks if required

ALWAYS GIVE LIST NUMBER WHEN ORDERING

Millimeter Size Twist Drills

STRAIGHT SHANK—SHORT SET OR JOBBERS LENGTH



No. 105E Carbon Steel

Diameter M. M.	Price Per Dozen	Length Over All M. M.	Length of Twist M. M.	Diameter M. M.	Price Per Dozen	Length Over All M. M.	Length of Twist M. M.
4.1	\$2.00	81	51	7.6	\$4.50	116	81
4.2	2.00	82	52	7.7	4.50	117	82
4.25	2.00	83	52	7.75	4.50	118	83
4.3	2.00	83	52	7.8	4.50	118	83
4.4	2.00	84	52	7.9	4.50	119	84
4.5	2.00	85	53	8.	4.50	120	86
4.6	2.25	86	54	8.1	5.00	121	87
4.7	2.25	87	55	8.2	5.00	122	88
4.75	2.25	88	56	8.25	5.00	123	89
4.8	2.25	88	56	8.3	5.00	123	89
4.9	2.25	89	57	8.4	5.00	124	90
5.	2.25	90	58	8.5	5.00	125	91
5.1	2.60	91	59	8.6	5.50	126	92
5.2	2.60	92	60	8.7	5.50	127	93
5.25	2.60	93	61	8.75	5.50	128	94
5.3	2.60	93	61	8.8	5.50	128	94
5.4	2.60	94	62	8.9	5.50	129	94
5.5	2.60	95	63	9.	5.50	130	95
5.6	2.95	96	64	9.1	6.00	131	96
5.7	2.95	97	65	9.2	6.00	132	97
5.75	2.95	98	66	9.25	6.00	133	98
5.8	2.95	98	66	9.3	6.00	133	98
5.9	2.95	99	67	9.4	6.00	134	99
6.	2.95	100	68	9.5	6.00	135	100
6.1	3.30	101	69	9.6	6.50	136	100
6.2	3.30	102	70	9.7	6.50	137	101
6.25	3.30	103	71	9.75	6.50	138	102
6.3	3.30	103	71	9.8	6.50	138	102
6.4	3.30	104	72	9.9	6.50	139	103
6.5	3.30	105	72	10.	6.50	140	103
6.6	3.65	106	73	10.25	7.25	140	104
6.7	3.65	107	74	10.5	7.25	140	104
6.75	3.65	108	75	10.75	8.00	145	107
6.8	3.65	108	75	11.	8.00	145	107
6.9	3.65	109	76	11.25	9.00	145	108
7.	3.65	110	77	11.50	9.00	145	108
7.1	4.00	111	77	11.75	10.00	150	111
7.2	4.00	112	78	12.	10.00	150	111
7.25	4.00	113	78	12.25	11.00	150	111
7.3	4.00	113	79	12.50	11.00	150	111
7.4	4.00	114	79	12.75	12.50	155	116
7.5	4.00	115	80	13.	12.50	155	116

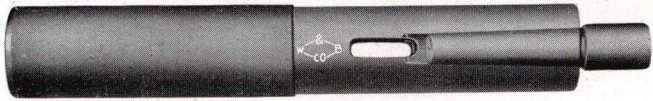
Packed: Ten of a size in a package.

Can be furnished with Two-Grooved Shanks if required.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Steel Sockets for Taper Shank Drills



No. 100. Rough End
Showing Center Plug Inserted

		Entire Length Ins.	Diameter of Rough End Ins.	Price Each
No. 1.	Holds $\frac{1}{8}$ to $\frac{9}{16}$ in., incl. . . .	7½	1⅛	\$1.20
No. 2.	Holds $\frac{3}{16}$ to $\frac{29}{32}$ in., incl. . . .	8	1¼	1.80
No. 3.	Holds $\frac{5}{16}$ to 1¼ in., incl. . . .	10	1½	2.50
No. 4.	Holds $\frac{17}{64}$ to 2 in., incl. . . .	13	2	4.00
No. 5.	Holds $2\frac{1}{64}$ to 3 in., incl. . . .	16	2¾	7.50
No. 6.	Holds $3\frac{1}{64}$ to 6 in., incl. . . .	22	3½	14.00

Centered Plugs for turning shanks furnished with these sockets.



No. 100A Fitted

Size	Description	Price Each
No. 1 to 2	Has No. 1 Hole and No. 2 Shank	\$2.00
1 to 3	Has No. 1 Hole and No. 3 Shank	2.50
1 to 4	Has No. 1 Hole and No. 4 Shank	3.20
1 to 5	Has No. 1 Hole and No. 5 Shank	4.80
2 to 3	Has No. 2 Hole and No. 3 Shank	2.50
2 to 4	Has No. 2 Hole and No. 4 Shank	3.20
2 to 5	Has No. 2 Hole and No. 5 Shank	4.80
3 to 2	Has No. 3 Hole and No. 2 Shank	3.20
3 to 3	Has No. 3 Hole and No. 3 Shank	3.20
3 to 4	Has No. 3 Hole and No. 4 Shank	3.20
3 to 5	Has No. 3 Hole and No. 5 Shank	4.80
4 to 3	Has No. 4 Hole and No. 3 Shank	4.80
4 to 4	Has No. 4 Hole and No. 4 Shank	4.80
4 to 5	Has No. 4 Hole and No. 5 Shank	4.80
4 to 6	Has No. 4 Hole and No. 6 Shank	12.00
5 to 4	Has No. 5 Hole and No. 4 Shank	12.00
5 to 5	Has No. 5 Hole and No. 5 Shank	12.00
5 to 6	Has No. 5 Hole and No. 6 Shank	12.00

For Dimensions of Taper Shanks see page 50.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

Steel Sleeves for Taper Shank Drills



No. 100B

Size	Description	Price Each
No. 1 to 2	Has No. 1 Hole and outside fitting No. 2 Socket	\$1.80
1 to 3	Has No. 1 Hole and outside fitting No. 3 Socket	2.40
1 to 4	Has No. 1 Hole and outside fitting No. 4 Socket	3.00
1 to 5	Has No. 1 Hole and outside fitting No. 5 Socket	4.40
2 to 3	Has No. 2 Hole and outside fitting No. 3 Socket	2.40
2 to 4	Has No. 2 Hole and outside fitting No. 4 Socket	3.00
2 to 5	Has No. 2 Hole and outside fitting No. 5 Socket	4.40
3 to 4	Has No. 3 Hole and outside fitting No. 4 Socket	3.00
3 to 5	Has No. 3 Hole and outside fitting No. 5 Socket	4.40
4 to 5	Has No. 4 Hole and outside fitting No. 5 Socket	4.40
4 to 6	Has No. 4 Hole and outside fitting No. 6 Socket	10.00
5 to 6	Has No. 5 Hole and outside fitting No. 6 Socket	10.00

For dimensions of Taper Shanks see page 50.

Center Keys or Drifts

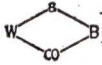


No. 100C

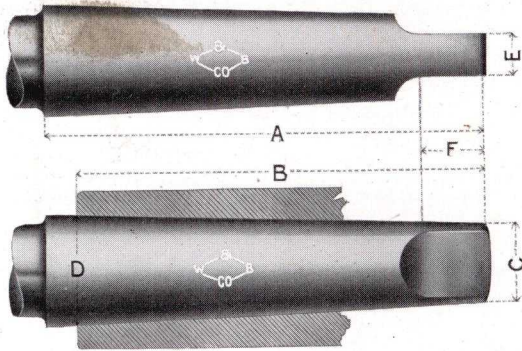
Drop forged from Special Steel, finished and case-hardened.
Size will fit corresponding numbers of sockets.

Number	1	2	3	4	5	6
Length, inches	6	6 $\frac{3}{4}$	7 $\frac{1}{2}$	8 $\frac{1}{2}$	10	11 $\frac{3}{4}$
Thickness, inches	$\frac{13}{64}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{15}{32}$	$\frac{5}{8}$	$\frac{3}{4}$
Width, inches	$\frac{23}{32}$	$\frac{27}{32}$	1 $\frac{1}{32}$	1 $\frac{7}{32}$	1 $\frac{7}{16}$	1 $\frac{11}{16}$
Price, each	\$0 30	.35	40	.50	60	.75

ALWAYS GIVE LIST NUMBER WHEN ORDERING



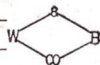
Dimensions of Shanks on Regular Taper Shank Drills



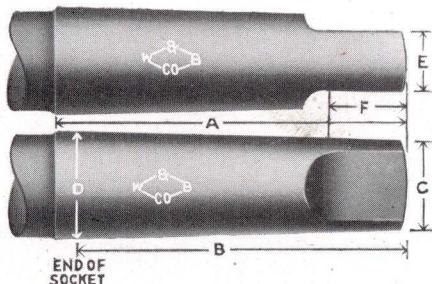
DIMENSIONS

Shank No.	A	B	C	D	E	F	TAPER PER		Drift No.
							Foot	Inch	
0	$2\frac{1}{32}$	$2\frac{7}{32}$	.2406	.3561	$\frac{5}{32}$	$\frac{1}{4}$	.625	.05208	0
1	$2\frac{9}{16}$	$2\frac{7}{16}$	.3531	.475	$\frac{13}{64}$	$\frac{3}{8}$	.600	.05	1
2	$3\frac{1}{8}$	$2\frac{15}{16}$	.5526	.700	$\frac{1}{4}$	$\frac{7}{16}$	.602	.05016	2
3	$3\frac{7}{8}$	$3\frac{11}{16}$	.753	.938	$\frac{5}{16}$	$\frac{9}{16}$	.602	.05016	3
4	$4\frac{7}{8}$	$4\frac{5}{8}$	.9909	1.231	$\frac{15}{32}$	$\frac{5}{8}$	.623	.05191	4
5	$6\frac{1}{8}$	$5\frac{7}{8}$	1.4395	1.748	$\frac{5}{8}$	$\frac{3}{4}$	.630	.0525	5
6	$8\frac{9}{16}$	$8\frac{1}{4}$	2.0636	2.494	$\frac{3}{4}$	$1\frac{1}{8}$	.626	.05216	6
7	$11\frac{5}{8}$	$11\frac{1}{4}$	2.684	3.270	$1\frac{1}{8}$	$1\frac{3}{8}$	.625	.05208	7

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Dimensions of "W. & B." Short Taper Shanks



DIMENSIONS

Shank No.	A	B	C	D	E	F	TAPER PER		Drift No.
							Foot	Inch	
0	$1\frac{31}{32}$	$1\frac{27}{32}$	260	356	$\frac{3}{16}$	$\frac{1}{4}$	.625	.05208	0
1	$2\frac{1}{16}$	2	375	475	$\frac{1}{4}$	$\frac{5}{16}$	.600	.05	1
2	$2\frac{9}{16}$	$2\frac{3}{8}$	.581	700	$\frac{3}{8}$	$\frac{7}{16}$	.602	.05016	2
3	$3\frac{1}{8}$	$2\frac{15}{16}$	791	938	$\frac{1}{2}$	$\frac{9}{16}$	.602	.05016	3
4	$4\frac{1}{16}$	$3\frac{13}{16}$	1 033	1.231	$\frac{5}{8}$	$\frac{5}{8}$	.623	.05191	4
5	$5\frac{1}{16}$	$4\frac{13}{16}$	1.495	1.748	1	$\frac{3}{4}$	.630	.0525	5
6	$7\frac{1}{16}$	$6\frac{3}{4}$	2 142	2 494	$1\frac{1}{4}$	$1\frac{1}{8}$	.626	.05216	6
7	$9\frac{11}{16}$	$9\frac{5}{16}$	2 785	3 270	$1\frac{5}{8}$	$1\frac{1}{2}$	.625	.05208	7

The "W. & B." SHORT SHANK is intended to furnish a stronger Taper Shank drive that will stand the heavy duty now required of tools.

It has the regular Taper and same length as regular Taper Shanks without the tang. The above table of dimensions may be followed in fitting with heavy tangs the Shanks of Drills from which the original tang has been broken or twisted off.

When desired any "W. & B." Taper Shank Tools will be fitted with "W. & B." SHORT SHANKS of regular Taper number at regular prices and discounts. When ordering, give catalog list number of tool and specify "W. & B." SHORT SHANKS.



“W. & B.” Short Taper Sockets and Sleeves



No. 101 Short Shank, Rough Socket

This Socket has “W. & B.” SHORT TAPER SHANK hole, and rough end Shank. Center plugs for turning are furnished with this Socket free of charge. Takes the same list prices as No. 100 on page 48.



No. 101A Short Shank, Fitted Socket

This Socket has “W. & B.” SHORT TAPER SHANK hole, and is fitted with regular Taper Shank, but will be furnished with “W. & B.” SHORT SHANK when so specified. Takes the same list prices as No. 100A on page 48.



No. 101B Short Shank, Sleeve

This Sleeve has “W. & B.” SHORT TAPER SHANK hole, and is fitted with regular Taper Shank outside, but will be furnished with “W. & B.” SHORT SHANK outside when so specified.

“W. & B.” SHORT SOCKETS are for use with tools fitted with “W. & B.” SHORT SHANKS, or in connection with Drills that have lost their original tang and have been fitted with heavy tangs on the old Shank, per dimensions on page 51. Takes the same list price as No. 100B on page 49.

All “W. & B.” Taper Shank tools will be fitted with “W. & B.” SHORT SHANKS of regular Taper number at regular prices and discounts. When ordering, give catalog number and specify “W. & B.” SHORT SHANKS.

Drill Cases



Cut Illustrates No. 1 Case

- No. 1** (37 inches wide by 44 inches high.)
Will hold Wire Drills Nos. 1 to 80—Jobbers' Drills $\frac{1}{16}$ to $\frac{1}{2}$ by 64ths—Bit Stock Drills $\frac{1}{32}$ to $\frac{1}{2}$ by 32nds—Taper or Straight Shank Drills $\frac{1}{4}$ to $1\frac{1}{4}$ by 32nds. Has two large drawers for Chucks, Sleeves, etc.
- No. 2** (38 inches wide by 83 inches high.)
Will hold Wire Drills Nos. 1 to 80—Jobbers' Drills $\frac{1}{16}$ to $\frac{1}{2}$ inch by 64ths—Bit Stock Drills $\frac{1}{32}$ to $\frac{1}{2}$ by 32nds—Straight Shank or Taper Shank Drills $\frac{1}{4}$ to 1 inch by 64ths—Straight Shank or Taper Shank Drills 1 inch to $2\frac{1}{32}$ inch by 32nds. Has two drawers for Chucks, etc.
- No. 4** (22 inches wide by 25 inches high.)
Will hold Wire Drills Nos. 1 to 60 inclusive and Jobbers' Drills $\frac{1}{16}$ to $\frac{1}{2}$ by 64ths. Has wooden trays. Two small drawers. One long drawer.
- No. 5** (28 inches wide by 27 inches high.)
Will hold Wire Drills Nos. 1 to 65—Jobbers' Drills $\frac{1}{16}$ to $\frac{1}{2}$ by 64ths—Straight Shank or Taper Shank Drills $\frac{1}{4}$ to $\frac{1}{2}$ by 64ths—Straight Shank or Taper Shank Drills $\frac{1}{2}$ to 1 inch by 32nds. Has wooden trays and one drawer for Chucks, Sleeves, etc.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



THE WHITMAN & BARNES MANUFACTURING CO.

W&B

“HERCULES*” HIGH SPEED DRILLS

THE addition of Vanadium in High Speed Steel increases its efficiency remarkably, and produces a Steel of **QUALITY, STRENGTH, TOUGHNESS** and **ENDURANCE**.

This Steel, worked under our process of twisting while hot, enables us to place upon the market our “HERCULES,” the strongest and toughest Twist Drill made. The process preserves the original grain of the steel, and at the same time the drill is serviceable where absolute accuracy is demanded.

“HERCULES” Drills are fitted with taper shanks, consequently require no special sockets or chucks.

*The name “HERCULES” applied to Twist Drills is our Registered Trade Mark.

"Hercules" High Speed Drills

TRADE MARK REGISTERED

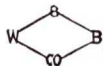


Diameter Ins.	Price Each	Length Over All Ins.	Length of Twist Ins.	Shank Taper	Diameter Ins.	Price Each	Length Over All Ins.	Length of Twist Ins.	Shank Taper
1 5/8	\$0.95	6	3	No. 1	4 5/8	\$2.25	9 7/8	6	No. 3
1 3/4	.95	6	3		4 3/4	2.25	9 7/8	6	
1 1/2	.95	6 1/8	3 1/16		4 1/4	2.40	10 1/8	6 1/4	
1 1/4	.95	6 1/8	3 1/16		4 3/4	2.40	10 1/8	6 1/4	
1 3/8	1.00	6 1/4	3 1/8		4 1/2	2.60	10 1/4	6 3/8	
1 1/2	1.00	6 1/4	3 1/8		4 1/4	2.60	10 1/4	6 3/8	
1 1/4	1.00	6 3/8	3 5/16		4 3/8	2.80	10 1/4	6 3/8	
1 1/2	1.00	6 3/8	3 5/16		4 1/2	2.80	12 5/16	6 1/2	
1 3/8	1.05	6 3/8	3 9/16		4 1/2	3.00	12 5/16	6 1/2	
1 1/2	1.05	6 5/8	3 9/16		4 3/4	3.00	12 5/16	6 1/2	
1 1/4	1.10	6 13/16	3 13/16		4 1/2	3.20	12 7/16	6 5/8	
1 1/2	1.10	6 13/16	3 13/16		4 3/4	3.20	12 7/16	6 5/8	
1 3/8	1.10	6 13/16	3 13/16		4 1/2	3.45	12 7/16	6 5/8	
1 1/2	1.10	7 3/16	3 9/16		4 3/4	3.45	12 7/16	6 5/8	
1 1/4	1.10	7 3/8	3 13/16		4 1/2	3.75	12 9/16	6 3/4	
1 1/2	1.10	7 3/8	3 13/16		4 3/4	3.75	12 9/16	6 3/4	
1 3/8	1.15	7 3/8	4 1/16		4 1/2	4.05	12 11/16	6 7/8	
1 1/2	1.15	7 3/8	4 1/16		4 3/4	4.05	12 11/16	6 7/8	
1 1/4	1.20	7 5/8	4 3/8	4 1/2	4.05	12 11/16	6 7/8		
1 1/2	1.20	7 5/8	4 3/8	4 3/4	4.35	12 11/16	6 7/8		
1 3/8	1.30	7 7/8	4 5/8	4 1/2	4.35	11 3/4	6 7/8		
1 1/2	1.30	7 7/8	4 5/8	4 3/4	4.75	11 3/4	6 7/8		
1 3/4	1.40	8 1/8	5	4 1/2	4.75	11 7/8	7		
1 1/2	1.40	8 1/8	5	4 3/4	4.75	11 7/8	7		
1 3/8	1.50	8 3/8	5 1/4	4 1/2	5.10	12	7 1/8		
1 1/2	1.50	8 3/8	5 1/4	4 3/4	5.10	12	7 1/8		
1 1/4	1.60	10 1/16	5 1/4	4 1/2	5.45	12 1/4	7 3/8		
1 1/2	1.60	10 1/16	5 1/4	4 3/4	5.45	12 1/4	7 3/8		
1 3/8	1.75	10 1/16	5 1/2	4 1/2	5.80	14 7/8	7 5/8		
1 1/2	1.75	10 1/16	5 1/2	4 3/4	5.80	14 7/8	7 5/8		
1 3/4	1.90	10 9/16	5 3/4	4 1/2	6.20	15	7 3/4		
1 1/2	1.90	10 9/16	5 3/4	4 3/4	6.20	15	7 3/4		
1 3/8	2.05	9 5/8	5 3/4	4 1/2	6.55	15 1/8	7 7/8		
1 1/2	2.05	9 5/8	5 3/4	4 3/4	6.55	15 1/8	7 7/8		
1 3/4	2.05	9 5/8	5 3/4	4 1/2	6.90	15 1/4	8		
1 1/2	2.05	9 5/8	5 3/4	4 3/4	6.90	15 1/4	8		

Continued on next page

*Sizes 3/8, 7/8 and 1 1/2 inches will be furnished with No. 2 shanks unless otherwise specified
Variation in length over all caused by collar on shank.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



"Hercules" High Speed Drills

TRADE-MARK REGISTERED



Diameter Ins.	Price Each	Length Over All Ins.	Length of Twist, Ins.	Shank Taper	Diameter Ins.	Price Each	Length Over All Ins.	Length of Twist, Ins.	Shank Taper
1 7/32	\$6.90	15 1/4	8	No. 4	1 45/64	\$13.60	19 1/16	10 1/8	No. 5
1 15/64	7.20	15 5/8	8 3/8		1 23/32	13.60	19 1/16	10 1/8	
1 1/4	7.20	15 5/8	8 3/8		1 47/64	14.10	19 3/16	10 1/4	
1 17/64	7.60	16 1/4	9		1 3/4	14.10	19 3/16	10 1/4	
1 9/32	7.60	16 1/4	9		1 49/64	14.55	19 5/16	10 3/8	
1 19/64	8.00	16 3/8	9 1/8		1 25/32	14.55	19 5/16	10 3/8	
1 5/16	8.00	16 3/8	9 1/8		1 51/64	15.00	19 7/16	10 1/2	
1 23/64	8.40	16 1/2	9 1/4		1 13/16	15.00	19 7/16	10 1/2	
1 11/32	8.40	16 1/2	9 1/4		1 53/64	15.50	19 5/8	10 5/8	
1 33/64	8.80	16 5/8	9 3/8		1 647/128	15.50	19 5/8	10 5/8	
1 3/8	8.80	16 5/8	9 3/8		1 33/16	16.00	19 3/4	10 3/4	
					1 17/8	16.00	19 3/4	10 3/4	
1 25/64	9.20	17 15/16	9		1 57/64	16.55	19 3/4	10 3/4	
1 13/32	9.20	17 15/16	9		1 649/128	16.55	19 3/4	10 3/4	
1 27/64	9.60	17 15/16	9		1 33/32	16.55	19 3/4	10 3/4	
1 7/16	9.60	17 15/16	9		1 59/64	17.10	19 3/4	10 3/4	
1 29/64	10.00	18 1/16	9 1/8	1 15/16	17.10	19 3/4	10 3/4		
1 15/32	10.00	18 1/16	9 1/8	1 61/64	17.65	19 3/4	10 3/4		
1 31/64	10.40	18 3/16	9 1/4	1 33/32	17.65	19 3/4	10 3/4		
1 1/2	10.40	18 3/16	9 1/4	1 63/64	18.20	19 3/4	10 3/4		
1 33/64	10.80	18 5/16	9 3/8	2	18.20	19 3/4	10 3/4		
1 35/32	10.80	18 5/16	9 3/8						
1 35/64	11.20	18 7/16	9 1/2	No. 5	2 1/64	18.85	19 5/8	10 1/8	No. 5
1 9/16	11.20	18 7/16	9 1/2		2 1/32	18.85	19 5/8	10 1/8	
1 37/64	11.65	18 9/16	9 5/8		2 3/64	19.50	19 5/8	10 1/8	
1 39/32	11.65	18 9/16	9 5/8		2 1/16	19.50	19 5/8	10 1/8	
1 39/64	12.10	18 11/16	9 3/4		2 5/64	20.15	19 5/8	10 1/8	
1 7/8	12.10	18 11/16	9 3/4		2 3/32	20.15	19 5/8	10 1/8	
1 41/64	12.60	18 13/16	9 7/8		2 7/64	20.80	19 5/8	10 1/8	
1 3/2	12.60	18 13/16	9 7/8		2 1/8	20.80	19 5/8	10 1/8	
1 43/64	13.05	18 15/16	10		2 9/64	21.50	19 5/8	10 1/8	
1 11/16	13.05	18 15/16	10		2 5/32	21.50	19 5/8	10 1/8	
					2 11/64	22.20	19 5/8	10 1/8	
					2 3/16	22.20	19 5/8	10 1/8	

Continued on next page

On sizes 1 3/8 to 2 inches inclusive, No. 4 Taper Shank will be furnished when so ordered. On sizes 2 1/4 to 3 inches inclusive, No. 6 Taper Shank can be furnished at special prices. Variation in length over all caused by collar on shank.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

"Hercules" High Speed Drills

TRADE-MARK REGISTERED



Diameter Ins.	Price Each	Length Over All Ins.	Length of Twist Ins.	Shank Taper	Diameter Ins.	Price Each	Length Over All Ins.	Length of Twist Ins.	Shank Taper
2 ¹³ / ₆₄	\$22.90	20 ¹ / ₈	10 ⁵ / ₈	No. 5	2 ³⁹ / ₆₄	\$32.00	22 ³ / ₁₆	12 ⁵ / ₈	No. 5
2 ⁷ / ₃₂	22.90	20 ¹ / ₈	10 ⁵ / ₈		2 ⁵ / ₈	32.00	22 ³ / ₁₆	12 ⁵ / ₈	
2 ¹⁵ / ₆₄	23.60	20 ¹ / ₈	10 ⁵ / ₈		2 ⁴¹ / ₆₄	33.00	22 ¹¹ / ₁₆	13 ¹ / ₈	
2 ¹ / ₄	23.60	20 ¹ / ₈	10 ⁵ / ₈		2 ²¹ / ₃₂	33.00	22 ¹¹ / ₁₆	13 ¹ / ₈	
2 ¹⁷ / ₆₄	24.30	20 ³ / ₁₆	10 ⁵ / ₈		2 ⁴³ / ₆₄	34.00	22 ¹¹ / ₁₆	13 ¹ / ₈	
2 ⁹ / ₃₂	24.30	20 ³ / ₁₆	10 ⁵ / ₈		2 ¹¹ / ₁₆	34.00	22 ¹¹ / ₁₆	13 ¹ / ₈	
2 ¹⁹ / ₆₄	25.00	20 ³ / ₁₆	10 ⁵ / ₈		2 ⁴⁵ / ₆₄	35.00	23 ³ / ₁₆	13 ⁵ / ₈	
2 ⁵ / ₁₆	25.00	20 ³ / ₁₆	10 ⁵ / ₈		2 ²³ / ₃₂	35.00	23 ³ / ₁₆	13 ⁵ / ₈	
2 ²¹ / ₆₄	25.70	20 ¹¹ / ₁₆	11 ¹ / ₈		2 ⁴⁷ / ₆₄	36.00	23 ³ / ₁₆	13 ⁵ / ₈	
2 ¹¹ / ₃₂	25.70	20 ¹¹ / ₁₆	11 ¹ / ₈		2 ³ / ₄	36.00	23 ³ / ₁₆	13 ⁵ / ₈	
2 ³² / ₆₄	26.40	20 ¹¹ / ₁₆	11 ¹ / ₈		2 ⁴⁹ / ₆₄	37.00	23 ³ / ₁₆	13 ⁵ / ₈	
2 ³ / ₈	26.40	20 ¹¹ / ₁₆	11 ¹ / ₈		2 ²⁵ / ₃₂	37.00	23 ³ / ₁₆	13 ⁵ / ₈	
2 ²⁵ / ₆₄	27.10	21 ³ / ₁₆	11 ⁵ / ₈		2 ⁵¹ / ₆₄	38.00	23 ³ / ₁₆	13 ⁵ / ₈	
2 ¹³ / ₃₂	27.10	21 ³ / ₁₆	11 ⁵ / ₈		2 ¹³ / ₁₆	38.00	23 ³ / ₁₆	13 ⁵ / ₈	
2 ²⁷ / ₆₄	27.80	21 ³ / ₁₆	11 ⁵ / ₈		2 ⁵³ / ₆₄	39.00	23 ¹¹ / ₁₆	14 ¹ / ₈	
2 ⁷ / ₁₆	27.80	21 ³ / ₁₆	11 ⁵ / ₈		2 ⁶⁴ / ₆₄	39.00	23 ¹¹ / ₁₆	14 ¹ / ₈	
2 ²⁹ / ₆₄	28.50	21 ¹¹ / ₁₆	12 ¹ / ₈		2 ³²	39.00	23 ¹¹ / ₁₆	14 ¹ / ₈	
2 ¹⁵ / ₃₂	28.50	21 ¹¹ / ₁₆	12 ¹ / ₈		2 ⁵⁵ / ₆₄	40.00	23 ¹¹ / ₁₆	14 ¹ / ₈	
2 ³¹ / ₆₄	29.20	21 ¹¹ / ₁₆	12 ¹ / ₈		2 ⁶⁴	40.00	23 ¹¹ / ₁₆	14 ¹ / ₈	
2 ¹ / ₂	29.20	21 ¹¹ / ₁₆	12 ¹ / ₈		2 ⁷ / ₈	40.00	23 ¹¹ / ₁₆	14 ¹ / ₈	
2 ³³ / ₆₄	29.90	21 ¹⁵ / ₁₆	12 ³ / ₈		2 ⁵⁷ / ₆₄	41.25	23 ¹¹ / ₁₆	14 ¹ / ₈	
2 ¹⁷ / ₃₂	29.90	21 ¹⁵ / ₁₆	12 ³ / ₈		2 ⁶⁴	41.25	23 ¹¹ / ₁₆	14 ¹ / ₈	
2 ³⁵ / ₆₄	30.60	21 ¹⁵ / ₁₆	12 ³ / ₈		2 ²⁹	42.50	23 ¹¹ / ₁₆	14 ¹ / ₈	
2 ⁹ / ₁₆	30.60	21 ¹⁵ / ₁₆	12 ³ / ₈		2 ⁶⁴	42.50	23 ¹¹ / ₁₆	14 ¹ / ₈	
2 ³⁷ / ₆₄	31.30	22 ³ / ₁₆	12 ⁵ / ₈		2 ⁶¹ / ₆₄	43.75	24 ¹¹ / ₁₆	15 ¹ / ₈	
2 ¹⁹ / ₃₂	31.30	22 ³ / ₁₆	12 ⁵ / ₈		2 ³²	43.75	24 ¹¹ / ₁₆	15 ¹ / ₈	
		22 ³ / ₁₆	12 ⁵ / ₈		2 ⁶³ / ₆₄	45.00	24 ¹¹ / ₁₆	15 ¹ / ₈	
					3	45.00	24 ¹¹ / ₁₆	15 ¹ / ₈	

On sizes $2\frac{1}{4}$ to 3 inches inclusive, No. 6 Taper Shank can be furnished at special prices.
Variation in length over all caused by collar on shank.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



"Economy" High Speed Track Bits



No. 504. Flat Beaded

Fitting Flat Drill Chucks on PAULUS, NEW STYLE PAULUS, BUDA, GIRDER AND HEAVY TRACK DRILLING MACHINES.

Thickness of bits $\frac{1}{2}$ inch to $\frac{1}{4}$ inch is $\frac{1}{8}$ inch. No. 1 Bead.

Thickness of bits $\frac{3}{8}$ inch to $1\frac{1}{4}$ inch is $\frac{3}{8}$ inch. No. 2 Bead.



No. 505. Flat with Round Slabbed Shanks

Fitting Chucks on PAULUS, BUDA, HARVEY, FRANCIS REED & CO.'S Nos. 18 AND 19, DUNTLEY AND SHEFFIED CAR CO.'S TRACK DRILLING MACHINES.

Thickness of bits $\frac{1}{2}$ inch to $\frac{1}{4}$ inch is $\frac{1}{8}$ inch.

Thickness of bits $\frac{3}{8}$ inch to $1\frac{1}{4}$ inch is $\frac{3}{8}$ inch.

Shanks on these bits are $2\frac{1}{4}$ inches long, .648 diameter, commonly called $\frac{1}{8}$ inch.



No. 509. Flat with Combination Flat Beaded and Round Shank

This bit will fit all Chucks for track drilling machines listed under Nos. 504 and 505 bits above.

Thickness of bits $\frac{1}{2}$ inch to $\frac{1}{4}$ inch is $\frac{1}{8}$ inch. No. 1 Bead.

Thickness of bits $\frac{3}{8}$ inch to $1\frac{1}{4}$ inch is $\frac{3}{8}$ inch. No. 2 Bead.

Shanks on these bits are $2\frac{1}{4}$ inches long, .648 diameter, commonly called $\frac{1}{8}$ inch.

Size Ins.	Length Ins.	Price Each	Size Ins.	Length Ins.	Price Each
$\frac{5}{8}$	$6\frac{1}{4}$	\$1.05	1	$6\frac{1}{4}$	\$1.55
$\frac{11}{16}$	$6\frac{1}{4}$	1.10	$1\frac{1}{16}$	$6\frac{1}{4}$	1.65
$\frac{3}{4}$	$6\frac{1}{4}$	1.20	$1\frac{1}{8}$	$6\frac{1}{4}$	1.75
$\frac{13}{16}$	$6\frac{1}{4}$	1.30	$1\frac{3}{16}$	$6\frac{1}{4}$	1.85
$\frac{7}{8}$	$6\frac{1}{4}$	1.40	$1\frac{1}{4}$	$6\frac{1}{4}$	1.95
$\frac{15}{16}$	$6\frac{1}{4}$	1.50			

Packed: Sizes $\frac{1}{2}$ inch and under, one dozen; $\frac{1}{2}$ to 1 inch, one-half dozen; 1 inch and larger, one-third dozen of a size in a package.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

Track Bits



No. 110 Carbon Steel

No. 506 "Diamond" High Speed

Shanks 2 1/4 inches long by 41/64 (.648) diameter.

Diameter Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.	Diameter Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.
	Carbon Steel	High Speed				Carbon Steel	High Speed		
1/8	\$0.50	..	4 7/8	2	3 1/2	\$2.40	\$3.90	6	3 5/16
3/32	.55	..	5 1/8	2 1/4	1	2.50	4.10	6	3 1/16
1/16	.60	....	5 3/8	2 1/2	1 1/2	2.60	4.30	6	3 1/4
3/32	.65	....	5 5/8	2 3/4	1 5/8	2.70	4.50	6	3 1/4
1/4	.70	\$1.20	6	3 1/8	1 3/2	2.80	4.75	6	3 1/4
9/32	.75	1.30	6	3 3/8	1 7/8	2.90	5.00	6	3 1/4
5/16	.80	1.40	6	3 1/2	1 3/2	3.00	5.25	6	3 1/4
11/32	.85	1.50	6	3 3/4	1 5/8	3.10	5.50	6	3 1/4
3/8	.90	1.55	6	3 1/4	1 3/2	3.20	5.80	6	3 1/4
13/32	.95	1.65	6	3 3/4	1 3/4	3.30	6.10	6	3 1/4
7/16	1.00	1.70	6	3 1/4	1 3/2	3.45	6.40	6	3 1/4
15/32	1.05	1.80	6	3 1/4	1 5/8	3.60	6.70	6	3 1/4
1/2	1.10	1.85	6	3 5/8	1 11/8	3.75	7.00	6	3 1/4
13/32	1.15	1.95	6	3 5/8	1 3/8	3.90	7.40	6	3 1/4
9/16	1.20	2.05	6	3 5/8	1 3/2	4.05	7.80	6	3 1/4
5/8	1.25	2.20	6	3 5/8	1 7/8	4.20	8.20	6	3 1/4
11/16	1.30	2.30	6	3 5/8	1 5/4	4.35	8.60	6	3 1/4
3/4	1.40	2.40	6	3 5/8	1 1/2	4.50	9.00	6	3 1/4
11/16	1.50	2.50	6	3 5/8	1 5/8	5.00	....	6	3 1/8
13/16	1.60	2.65	6	3 5/8	1 3/8	5.50	....	6	3 1/8
3/4	1.70	2.75	6	3 5/8	1 1/2	6.00	....	6	3 1/8
15/16	1.80	2.90	6	3 5/8	1 3/4	6.50	....	6	3 1/8
1	1.90	3.00	6	3 5/8	1 13/16	7.00	....	6	3 1/8
1 1/16	2.00	3.15	6	3 5/8	1 7/8	8.00	....	6	3 1/8
1 1/8	2.10	3.30	6	3 5/8	1 15/8	9.00	....	6	3 1/8
1 1/4	2.20	3.50	6	3 5/8	2	10.00	....	6	3 1/8
1 1/2	2.30	3.70	6	3 5/8			....	6	3 1/8

Packed: Sizes 1 inch and smaller, one dozen of a size in a box; 1 1/4 to 1 3/2 inches, one-third dozen; 1 1/2 to 1 5/2 inches, one-sixth dozen of a size in a package.

Bonding Bits



No. 105F Carbon Steel

No. 508 "Diamond" High Speed

FOR DRILLING BOND WIRE HOLES FOR TRACK CIRCUIT SIGNAL WORK

Diameter Inches	PRICE PER DOZEN		High Speed Shank	Length Inches	Length of Twist
	Carbon Steel	High Speed			
3/8	....	....	3/2	3	1 1/4
3/8	....	....	3/8	3	1 3/4
9/32	\$3.80	\$9.10		3	1 3/4

*Made only in High Speed for Duplex Channel Pins. Price on application.
Specify shank wanted, otherwise 3/2 shank will be sent.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Track Bits

WITH TAPER SQUARE SHANKS FITTING RATCHETS AND LUDLOW ELECTRIC TRACK DRILLS



No. 109E Carbon Steel No. 507 "Diamond" High Speed

Diameter Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.	Diameter Ins.	PRICE EACH		Length Over All Ins.	Length of Twist Ins.
	Carbon Steel	High Speed				Carbon Steel	High Speed		
1/8	\$0.90	....	4 1/4	2	3 1/32	\$2.40	\$5.25	8 1/4	6 1/8
5/32	.95	....	4 5/8	2 1/4	1	2.55	5.50	8 1/2	6 3/8
3/16	.95	....	4 3/4	2 3/8	1 1/32	2.70	5.75	8 3/4	6 5/8
7/32	1.00	....	4 7/8	2 5/8	1 1/16	2.85	6.00	9	6 7/8
1/4	1.00	\$2.50	5	2 3/4	1 3/32	3.00	6.30	9	6 7/8
9/32	1.05	2.55	5	2 3/4	1 1/8	3.10	6.70	9	6 7/8
5/16	1.10	2.60	5	2 7/8	1 5/32	3.25	7.00	9	6 7/8
11/32	1.15	2.65	5	2 7/8	1 3/16	3.35	7.30	9	6 7/8
3/8	1.20	2.70	6	3 7/8	1 7/32	3.50	7.60	9	6 7/8
13/32	1.25	2.75	6 1/4	4 1/8	1 1/4	3.65	7.90	9	6 7/8
7/16	1.25	2.80	6 1/4	4 1/8	1 9/32	3.75	8.25	9	6 13/16
15/32	1.30	2.85	6 1/4	4 1/8	1 5/16	3.90	8.60	9	6 13/16
1/2	1.30	2.90	6 1/2	4 3/8	1 11/32	4.05	9.00	9	6 13/16
17/32	1.35	2.95	6 1/2	4 3/8	1 3/8	4.20	9.40	9	6 13/16
9/16	1.35	3.00	6 1/2	4 3/8	1 13/32	4.35	9.80	9	6 13/16
19/32	1.40	3.10	6 1/2	4 3/8	1 7/16	4.50	10.20	9	6 13/16
5/8	1.40	3.20	6 1/2	4 3/8	1 15/32	4.65	10.60	9	6 13/16
21/32	1.45	3.30	6 1/2	4 3/8	1 1/2	4.80	11.00	9	6 13/16
11/16	1.45	3.40	6 1/2	4 3/8	1 9/16	5.10	..	9	6 13/16
23/32	1.50	3.50	6 1/2	4 3/8	1 5/8	5.40	..	9	6 13/16
3/4	1.55	3.65	6 1/2	4 3/8	1 11/16	5.75	..	9	6 3/4
25/32	1.65	3.80	6 1/2	4 3/8	1 3/4	6.10	..	9	6 3/4
13/16	1.75	4.00	7	4 7/8	1 13/16	6.50	..	9	6 3/4
27/32	1.90	4.20	7	4 7/8	1 7/8	6.90	..	9	6 3/4
7/8	2.05	4.50	7 1/2	5 3/8	1 15/16	7.30	..	9	6 3/4
29/32	2.20	4.70	7 3/4	5 5/8	2	7.75	..	9	6 3/4
1 1/16	2.30	5.00	8	5 7/8					

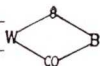
A Shanks—3/8 inch by 5/8 inch by 1 1/2 inches long.

B Shanks—1/2 inch by 3/4 inch by 1 3/4 inches long.

Unless otherwise specified A shank will be furnished. On HIGH SPEED over 1 inch, B shank will be furnished.

Packed: Sizes 1/8 to 5/8 inch, one dozen; 3/4 to 1 inch, one-half dozen; 1 1/4 to 1 1/2 inch, one-third dozen; 1 3/4 to 1 5/8 inch, one-sixth dozen of a size in a package.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



REAMERS

IN the Reamer Section of this Catalog we present the well known "W. & B." "Diamond" Carbon and High Speed Types. They have been developed to their present standard of efficiency by the same careful manufacturing supervision that has created the superior reputation of the "W. & B." line.

As drills are bought because holes are wanted, and at the lowest cost, so Reamers are bought because finished holes are desired. Therefore, the office of Reamers, is *accuracy*.

The line of "W. & B." Reamers is produced with a view of giving the greatest number of holes with the least loss of size in the Reamer. In the first place, they are produced from the highest grade raw material, and given proper construction and temper to insure their holding true to size while giving maximum production. A very close inspection after every operation insures their leaving the factory perfect in material and workmanship. Each type of Reamer is designed for a special purpose and is best adapted to successfully handle the work for which it is intended.



Hand Reamers

(ECCENTRIC FLUTES)



No. 115 Carbon Steel

No. 250 "Diamond" High Speed

Diameter Ins.	PRICE EACH		Length Over All Ins.	Length of Flute Ins.	Diameter Ins.	PRICE EACH		Length Over All Ins.	Length of Flute Ins.
	Carbon Steel	High Speed				Carbon Steel	High Speed		
1/8	\$1.00	\$3.00	3	1 1/2	1 11/32	\$5.40	\$18.75	12 17/32	6 17/64
5/32	1.10	3.25	3 1/4	1 5/8	1 3/8	5.60	18.75	12 5/8	6 5/16
3/16	1.20	3.25	3 1/2	1 3/4	1 13/32	5.80	20.50	12 23/32	6 23/64
7/32	1.30	3.50	3 3/4	1 7/8	1 7/16	6.00	20.50	12 13/16	6 13/32
1/4	1.40	3.50	4	2	1 13/32	6.20	22.25	12 3/2	6 29/64
9/32	1.45	3.75	4 1/4	2 1/8	1 1/2	6.40	22.25	13	6 1/2
5/16	1.50	3.75	4 1/2	2 1/4	1 7/32	6.60	24.00	13	6 1/2
11/32	1.55	4.25	4 3/4	2 3/8	1 9/16	6.80	24.00	13	6 1/2
3/8	1.60	4.25	5	2 1/2	1 3/2	7.00	25.75	13	6 1/2
13/32	1.70	4.75	5 1/4	2 5/8	1 5/8	7.20	25.75	13	6 1/2
7/16	1.75	4.75	5 1/2	2 3/4	1 21/32	7.40	27.50	13 1/2	6 3/4
15/32	1.85	5.25	5 3/4	2 7/8	1 11/16	7.60	27.50	13 1/2	6 3/4
1/2	1.90	5.25	6	3	1 3/2	7.80	29.50	13 1/2	6 3/4
17/32	1.95	5.75	6 1/4	3 1/8	1 3/4	8.00	29.50	13 1/2	6 3/4
9/16	2.00	5.75	6 1/2	3 1/4	1 29/32	8.20	31.50	13 1/2	6 3/4
19/32	2.10	6.25	6 3/4	3 3/8	1 13/16	8.40	31.50	13 1/2	6 3/4
5/8	2.20	6.25	7	3 1/2	1 3/2	8.60	33.50	13 1/2	6 3/4
21/32	2.30	6.75	7 11/32	3 3/4	1 7/8	8.80	33.50	14	7
11/16	2.40	6.75	7 1/16	3 5/8	1 29/32	9.00	35.75	14	7
23/32	2.50	7.25	8 1/8	4 1/16	1 15/16	9.20	35.75	14	7
3/4	2.60	7.25	8 3/8	4 1/8	1 3/2	9.40	38.00	14	7
25/32	2.70	7.75	8 23/32	4 23/32	2	9.60	38.00	14	7
13/16	2.80	7.75	9 1/16	4 13/16	2 1/16	10.00	40.75	14 1/2	7 1/4
27/32	2.95	8.50	9 3/8	4 11/16	2 1/8	10.40	43.50	14 1/2	7 1/4
7/8	3.10	8.50	9 11/16	4 27/32	2 3/16	10.80	46.25	15	7 1/2
29/32	3.25	9.50	10 3/32	5 3/64	2 1/4	11.30	49.00	15	7 1/2
15/16	3.40	9.50	10 1/4	5 1/8	2 5/16	11.80	51.75	15	7 1/2
31/32	3.55	10.50	10 11/16	5 11/32	2 3/8	12.30	55.00	15	7 1/2
1	3.70	10.50	10 7/8	5 7/16	2 1/2	12.80	58.25	15 1/2	7 3/4
1 1/32	3.85	11.50	11 1/16	5 17/32	2 1/2	13.40	61.50	15 1/2	7 3/4
1 1/16	4.00	11.50	11 1/4	5 5/8	2 5/16	14.00	64.75	15 1/2	7 3/4
1 3/32	4.15	12.75	11 7/16	5 23/32	2 5/8	14.60	68.00	16	8
1 1/8	4.30	12.75	11 5/8	5 13/16	2 1/2	15.40	71.25	16	8
1 5/32	4.45	14.25	11 13/16	5 29/32	2 3/4	16.20	74.50	16	8
1 3/16	4.60	14.25	12	6	2 13/16	17.00	77.75	16 1/2	8 1/4
1 7/32	4.75	15.75	12 1/8	6 1/16	2 7/8	17.80	81.00	16 1/2	8 1/4
1 1/4	4.90	15.75	12 1/4	6 1/8	2 15/16	18.60	84.25	16 1/2	8 1/4
1 9/32	5.05	17.25	12 11/32	6 11/16	3	19.40	87.50	16 1/2	8 1/4
1 5/16	5.20	17.25	12 7/16	6 7/32					

Sixty-fourth sizes between 1/8 inch and 1/2 inch take list of next larger 32nd size. All sizes and dimensions not listed are special and subject to special prices.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

Self Feeding Reamers



No. 122

Hand Reamers, Jobbers Set with Threaded End

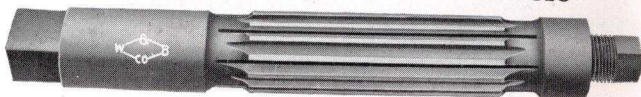
Diameter Ins.	Price Each	Length Over All, Ins.	Length of Flute, Ins.	Diameter Ins.	Price Each	Length Over All, Ins.	Length of Flute, Ins.
1/4	\$1.55	4	2	1 9/32	\$5.55	12 1/2	6 1/4
1/4	1.60	4 1/4	2 1/8	1 5/16	5.70	12 7/16	6 3/2
9/32	1.60	4 1/4	2 1/8	1 11/32	5.95	12 1/2	6 7/8
1/4	1.65	4 1/2	2 1/4	1 3/8	6.15	12 5/8	6 5/4
5/16	1.65	4 1/2	2 1/4	1 13/32	6.40	12 3/2	6 23/4
21/32	1.70	4 3/4	2 3/8	1 7/16	6.60	12 1/2	6 13/2
11/16	1.70	4 3/4	2 3/8	1 15/32	6.80	12 29/32	6 29/4
3/8	1.75	5	2 1/2	1 1/2	7.05	13	6 1/2
25/32	1.75	5	2 1/2	1 17/32	7.25	13	6 1/2
13/16	1.85	5 1/4	2 5/8	1 9/16	7.50	13	6 1/2
3/4	1.85	5 1/4	2 5/8	1 19/32	7.70	13	6 1/2
7/8	1.95	5 1/2	2 3/4	1 5/8	7.90	13	6 1/2
15/16	1.95	5 1/2	2 3/4	1 21/32	8.15	13 1/2	6 3/4
1	2.05	5 3/4	2 7/8	1 11/16	8.35	13 1/2	6 3/4
1 1/16	2.05	5 3/4	2 7/8	1 23/32	8.60	13 1/2	6 3/4
1 1/8	2.10	6	3	1 3/4	8.80	13 1/2	6 3/4
1 1/4	2.10	6	3	1 25/32	9.00	13 1/2	6 3/4
1 1/2	2.15	6 1/4	3 1/8	1 11/8	9.25	13 1/2	6 3/4
1 3/4	2.20	6 1/2	3 1/4	1 27/32	9.45	13 1/2	6 3/4
1 7/8	2.30	6 3/4	3 3/8	1 7/8	9.70	14	7
1 5/8	2.40	7	3 1/2	1 29/32	9.90	14	7
1 1/2	2.55	7 11/32	3 3/4	1 15/16	10.10	14	7
1 1/4	2.65	7 11/16	3 3/2	1 31/32	10.35	14	7
1 1/8	2.75	8 1/8	4 1/16	2	10.55	14	7
1 1/16	2.85	8 3/8	4 3/16	2 1/16	11.00	14 1/2	7 1/4
1 1/8	3.00	8 23/32	4 23/64	2 1/8	11.45	14 1/2	7 1/4
1 1/16	3.10	9 1/16	4 17/32	2 3/16	11.90	15	7 1/2
1 1/8	3.25	9 3/8	4 11/16	2 1/4	12.45	15	7 1/2
1 1/4	3.40	9 11/16	4 27/32	2 5/16	13.00	15	7 1/2
1 1/2	3.60	10 3/32	5 3/64	2 3/8	13.55	15	7 1/2
1 3/4	3.75	10 1/4	5 1/8	2 7/16	14.10	15 1/2	7 3/4
1 7/8	3.90	10 11/16	5 1/2	2 1/2	14.75	15 1/2	7 3/4
1 5/8	4.05	10 7/8	5 7/16	2 9/16	15.40	15 1/2	7 3/4
1 1/2	4.25	11 1/16	5 1/2	2 5/8	16.05	16	8
1 1/4	4.40	11 1/4	5 5/8	2 11/16	16.95	16	8
1 1/8	4.55	11 1/16	5 23/32	2 3/4	17.80	16	8
1 1/16	4.75	11 5/8	5 13/16	2 13/16	18.70	16 1/2	8 1/4
1 1/8	4.90	11 11/16	5 23/32	2 7/8	19.60	16 1/2	8 1/4
1 1/4	5.05	12	6	2 15/16	20.45	16 1/2	8 1/4
1 1/2	5.25	12 1/8	6 1/8	3	21.35	16 1/2	8 1/4
1 3/4	5.40	12 1/4	6 1/8				

All sizes and dimensions not listed are special and subject to special prices.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



"Diamond" Expansion Reamers



No. 121

Diameter Inches	Price Each	Length Over All Inches	Length of Flute Inches
1/4	\$3.00	3 3/4	1 1/2
5/32	3.05	4	1 1/8
3/16	3.10	4	1 5/8
11/32	3.15	4 1/4	1 11/16
1/2	3.20	4 1/2	1 3/4
5/8	3.25	4 1/2	1 3/4
3/4	3.30	4 1/2	1 13/16
7/8	3.35	5	1 11/8
1	3.40	5	1 7/8
1 1/8	3.50	5 3/8	1 7/8
1 1/4	3.65	5 3/8	1 11/8
1 1/2	3.80	5 7/8	2 1/8
1 3/4	4.00	5 7/8	2 3/8
1 7/8	4.20	6 1/4	2 3/8
2	4.40	6 1/4	2 1/2
2 1/8	4.60	6 1/2	2 1/2
2 1/4	4.80	6 1/2	2 5/8
2 3/8	5.00	7	2 3/4
2 1/2	5.25	7	3
2 3/4	5.50	7 1/2	3 1/8
3	5.75	7 1/2	3 1/8
3 1/8	6.00	7 7/8	3 1/8
3 1/4	6.25	7 7/8	3 1/8
3 1/2	6.50	7 7/8	3 1/8
3 3/4	6.75	8 3/8	3 3/4
4	7.25	8 3/8	3 7/8
4 1/8	7.75	9	4
4 1/4	8.30	9 3/8	4 1/4
4 1/2	8.90	9 3/4	4 3/8
4 3/4	9.50	10 1/8	4 3/8
5	10.50	10 5/8	4 3/4
5 1/8	11.50	10 7/8	4 3/4
5 1/4	12.50	11 1/8	4 13/16
5 1/2	13.00	11 1/4	4 13/16
5 3/8	13.50	11 1/2	4 7/8
5 1/2	14.00	11 5/8	4 7/8
5 3/4	14.50	11 7/8	4 15/16
6	15.00	12 1/8	4 15/16
6 1/8	15.50	12 1/4	5
6 1/4	16.00	12 3/8	5
6 1/2	16.50	12 1/2	5 1/16
6 3/4	17.50	12 3/4	5 1/16
7	18.50	13	5 1/8
7 1/8	19.50	13 1/2	5 1/4
7 1/4	20.50	14	5 3/8

Limits of expansion recommended for these Reamers are as follows: Sizes 1/4 to 1 1/2, .006 inch; 1 1/2 to 3 1/2, .010 inch; 1 to 1 3/4, .012 inch; 1 3/4 to 3, .015 inch.
 Reamers for Brass or Babbitt require speed clearance and are furnished when desired.
 All sizes and dimensions not listed are special and subject to special prices.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

Taper Shank Jobbers Reamers



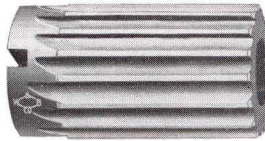
No. 116 Carbon Steel

No. 251 "Diamond" High Speed

Diameter Ins.	PRICE EACH		Length Over All Ins.	Length of Flute Ins.	Shank Taper	Diameter Ins.	PRICE EACH		Length Over All Ins.	Length of Flute Ins.	Shank Taper		
	Carbon Steel	High Speed					Carbon Steel	High Speed					
1/4	\$1.70	\$4.00	5 3/16	2	No. 1	1	\$4.45	\$11.50	10 3/8	5 7/16	No. 3		
5/16	1.75	4.25	5 1/16	2		1 1/32	4.60	12.50	10 3/8	5 7/16			
3/8	1.75	4.25	5 3/16	2		1 1/16	4.80	12.50	10 5/8	5 5/8			
7/16	1.80	4.25	5 1/2	2 1/4		1 3/32	5.00	13.75	10 5/8	5 5/8			
1/2	1.80	4.25	5 1/2	2 1/4		1 1/8	5.15	13.75	10 7/8	5 13/16			
9/16	1.85	4.75	5 1/2	2 1/4		1 5/32	5.35	15.25	10 7/8	5 13/16			
5/8	1.85	4.75	5 1/2	2 1/4		1 1/16	5.50	15.25	11 1/8	6			
11/16	1.90	4.75	5 13/16	2 1/2		1 7/32	5.70	16.75	11 1/8	6			
3/4	1.90	4.75	5 13/16	2 1/2		No. 2	1 1/4	5.90	16.75	12 1/2		6 1/8	No. 4
13/16	2.05	5.25	5 13/16	2 1/2			1 9/32	6.05	18.25	12 1/2		6 1/8	
7/8	2.05	5.25	5 13/16	2 1/2			1 5/16	6.25	18.25	12 11/16		6 1/4	
15/16	2.15	5.25	6 1/8	2 3/4			1 11/32	6.50	19.75	12 11/16		6 1/4	
1	2.15	5.25	6 1/8	2 3/4	1 3/8		6.70	19.75	12 13/16	6 5/16			
1 1/16	2.20	5.75	6 1/8	2 3/4	1 3/2		6.95	21.50	12 13/16	6 5/16			
1 1/8	2.20	5.75	6 1/8	2 3/4	1 7/16		7.20	21.50	13	6 7/16			
1 1/4	2.30	5.75	6 7/16	3	1 3/2		7.45	23.25	13	6 7/16			
1 1/2	2.30	5.75	6 7/16	3	1 1/2		7.70	23.25	13 1/8	6 1/2			
1 3/4	2.35	6.25	6 7/16	3	1 17/32		7.90	25.00	13 1/8	6 1/2			
1 5/8	2.40	6.25	6 3/4	3 1/4	1 9/16		8.15	25.00	13 1/8	6 1/2			
1 3/2	2.50	6.75	6 3/4	3 1/4	1 5/8		8.40	26.75	13 1/8	6 1/2			
1 1/2	2.65	6.75	7 9/16	3 1/2	1 5/8	8.65	26.75	13 1/8	6 1/2				
1 1/4	2.75	7.25	7 9/16	3 1/2	1 3/2	8.90	28.50	13 1/8	6 1/2				
1 1/8	2.90	7.25	8	3 7/8	1 11/16	9.10	28.50	13 3/8	6 3/4				
1 1/16	3.00	7.75	8	3 7/8	1 3/2	9.35	30.50	13 3/8	6 3/4				
1 1/8	3.10	7.75	8 3/8	4 3/16	No. 3	1 3/4	9.60	30.50	14 11/16	6 3/4	No. 5		
1 1/4	3.25	8.50	8 3/8	4 3/16		1 25/32	9.85	32.50	14 11/16	6 3/4			
1 1/2	3.35	8.50	8 13/16	4 9/16		1 13/16	10.10	32.50	14 11/16	6 3/4			
1 3/4	3.55	9.50	8 13/16	4 9/16		1 27/32	10.30	34.50	14 11/16	6 3/4			
1 5/8	3.70	9.50	8 13/16	4 7/8		1 3/2	10.55	34.50	15	7			
1 3/2	3.90	10.50	9 1/16	4 7/8		1 7/8	10.80	36.75	15	7			
1 1/2	4.10	10.50	10	5 1/8		1 29/32	11.05	36.75	15	7			
1 1/4	4.25	11.50	10	5 1/8		1 15/16	11.30	39.00	15	7			
1 1/8						1 3/2	11.50	39.00	15	7			
1 1/16						2			15	7			

All sizes and dimensions not listed are special and subject to special prices.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Fluted Shell Reamers

No. 117 Carbon Steel

No. 260 "Diamond" High Speed

Diameter Ins.	PRICE EACH		Length Over All Ins.	Size Hole Large End	Fitting Arbor	Diameter Ins.	PRICE EACH		Length Over All Ins.	Size Hole Large End	Fitting Arbor
	Carbon Steel	High Speed					Carbon Steel	High Speed			
1/2	\$1.70	\$3.25	2	1/4	No. 3	2 3/4	\$11.00	\$24.25	4	1 1/2	No. 10
	1.80	3.40	2	1/4		2 13/16	11.40	25.50	4	1 1/2	
	1.90	3.55	2	1/4		2 7/8	11.80	27.00	4	1 1/2	
11/16	2.00	3.70	2 1/4	3/8	No. 4	2 11/16	12.20	28.50	4	1 1/2	No. 10
	2.10	3.85	2 1/4	3/8		3	12.60	30.00	4	1 1/2	
1 1/8	2.20	4.00	2 1/2	1/2	No. 5	3 1/16	13.10	31.50	4 1/2	1 3/4	No. 11
	2.30	4.25	2 1/2	1/2		3 1/8	13.60	33.25	4 1/2	1 3/4	
	2.40	4.50	2 1/2	1/2		3 3/16	14.10	35.25	4 1/2	1 3/4	
1	2.50	4.75	2 1/2	1/2	No. 6	3 1/4	14.60	37.50	4 1/2	1 3/4	No. 11
						3 5/16	15.10	40.00	4 1/2	1 3/4	
						3 3/8	15.60	42.50	4 1/2	1 3/4	
1 1/16	2.70	5.00	2 3/4	5/8	No. 7	3 7/8	16.10	45.25	4 1/2	1 3/4	No. 12
1 1/8	2.90	5.25	2 3/4	5/8		3 1/2	16.60	48.00	4 1/2	1 3/4	
1 1/16	3.10	5.50	2 3/4	5/8							
1 1/4	3.30	5.75	2 3/4	5/8	No. 8	3 9/16	17.20	50.75	5	2	No. 12
						3 5/8	17.80	53.50	5	2	
						3 11/16	18.40	56.50	5	2	
1 5/16	3.55	6.00	3.	3/4	No. 9	3 3/4	19.00	59.50	5	2	No. 12
1 3/8	3.80	6.50	3	3/4		3 1/2	19.60	62.75	5	2	
1 7/16	4.05	7.00	3	3/4		3 7/8	20.20	66.00	5	2	
1 1/2	4.30	7.50	3	3/4	No. 10	3 15/16	20.80	69.25	5	2	No. 12
1 1/16	4.55	8.25	3	3/4		4	21.40	72.50	5	2	
1 1/8	4.80	9.00	3	3/4							
1 1/4	5.10	9.75	3 1/2	1	No. 11	4 1/8	22.90	79.00	5 1/2	2 1/4	No. 13
1 3/4	5.40	10.50	3 1/2	1		4 1/4	24.40	85.50	5 1/2	2 1/4	
1 13/16	5.70	11.25	3 1/2	1		4 3/8	25.90	92.00	5 1/2	2 1/4	
1 7/8	6.00	12.00	3 1/2	1	No. 12	4 1/2	27.40	98.50	5 1/2	2 1/4	No. 13
1 15/16	6.30	12.75	3 1/2	1							
2	6.60	13.50	3 1/2	1							
2 1/16	6.95	14.25	3 3/4	1 1/4	No. 13	4 5/8	29.30	105.00	6	2 1/2	No. 14
2 1/8	7.30	15.00	3 3/4	1 1/4		4 3/4	31.20	111.50	6	2 1/2	
2 3/16	7.65	15.75	3 3/4	1 1/4		4 7/8	33.10	118.00	6	2 1/2	
2 1/4	8.00	16.50	3 3/4	1 1/4	No. 14	5	35.00	125.00	6	2 1/2	No. 14
2 1/16	8.35	17.25	3 3/4	1 1/4		5 1/8	37.40	132.50	6	2 1/2	
2 3/8	8.70	18.00	3 3/4	1 1/4		5 1/4	39.80	140.00	6	2 1/2	
2 1/2	9.05	18.75	3 3/4	1 1/4	No. 15	5 3/8	42.20	147.50	6	2 1/2	No. 15
2 5/8	9.40	19.50	3 3/4	1 1/4		5 1/2	44.60	155.00	6	2 1/2	
2 3/4	9.80	20.50	4	1 1/2		5 3/8	47.60	163.75	6 1/2	2 3/4	
2 7/8	10.20	21.75	4	1 1/2	No. 16	5 7/8	50.60	172.50	6 1/2	2 3/4	No. 15
2 15/16	10.60	23.00	4	1 1/2		6	53.60	181.25	6 3/8	2 3/4	
							56.60	190.00	6 1/2	2 3/4	

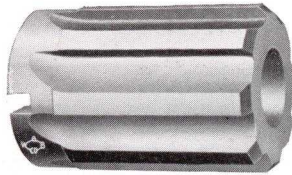
Thirty-second sizes not listed from 1/2 inch to 2 inch take list and arbor of next larger size.

For Shell Reamer Arbors see pages 68 and 69.

All sizes and dimensions not listed are special and subject to special prices.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

Rose Shell Reamers



No. 117A Carbon Steel

No. 261 "Diamond" High Speed

Diameter Ins.	PRICE EACH		Length Over All Ins.	Size Hole Large End	Fitting Arbor	Diameter Ins.	PRICE EACH		Length Over All Ins.	Size Hole Large End	Fitting Arbor
	Carbon Steel	High Speed					Carbon Steel	High Speed			
1/2	\$1.70	\$3.25	2	1/4	No. 3	2 3/4	\$11.00	\$24.25	4	1 1/2	No. 10
5/8	1.80	3.40	2	1/4		2 11/8	11.40	25.50	4	1 1/2	
3/8	1.90	3.55	2	1/4		2 7/8	11.80	27.00	4	1 1/2	
1 1/8	2.00	3.70	2 1/4	3/8	No. 4	2 1 1/8	12.20	28.50	4	1 1/2	No. 10
3/4	2.10	3.85	2 1/4	3/8		3	12.60	30.00	4	1 1/2	
1 1/8	2.20	4.00	2 1/2	1/2	No. 5	3 1/8	13.10	31.50	4 1/2	1 3/4	No. 11
1 1/8	2.30	4.25	2 1/2	1/2		3 1/8	13.60	33.25	4 1/2	1 3/4	
1 1/8	2.40	4.50	2 1/2	1/2		3 1/4	14.10	35.25	4 1/2	1 3/4	
1	2.50	4.75	2 1/2	1/2	No. 6	3 1/2	14.60	37.50	4 1/2	1 3/4	No. 11
1 1/16	2.70	5.00	2 3/4	5/8		3 5/8	15.10	40.00	4 1/2	1 3/4	
1 1/8	2.90	5.25	2 3/4	5/8		3 7/8	15.60	42.50	4 1/2	1 3/4	
1 1/8	3.10	5.50	2 3/4	5/8	No. 7	3 7/8	16.10	45.25	4 1/2	1 3/4	No. 11
1 1/4	3.30	5.75	2 3/4	5/8		3 1 1/2	16.60	48.00	4 1/2	1 3/4	
1 5/16	3.55	6.00	3	3/4		3 5/8	17.20	50.75	5	2	
1 3/8	3.80	6.50	3	3/4	No. 8	3 5/8	17.80	53.50	5	2	No. 12
1 1/2	4.05	7.00	3	3/4		3 1 1/8	18.40	56.50	5	2	
1 1/2	4.30	7.50	3	3/4		3 3/4	19.00	59.50	5	2	
1 1/16	4.55	8.25	3	3/4	No. 9	3 1 1/2	19.60	62.75	5	2	No. 12
1 1/8	4.80	9.00	3	3/4		3 7/8	20.20	66.00	5	2	
1 1/8	4.80	9.00	3	3/4		3 1 1/8	20.80	69.25	5	2	
1 1/8	5.10	9.75	3 1/2	1	No. 10	4	21.40	72.50	5	2	No. 12
1 3/4	5.40	10.50	3 1/2	1		4 1/8	22.90	79.00	5 1/2	2 1/4	
1 1/2	5.70	11.25	3 1/2	1		4 1/4	24.40	85.50	5 1/2	2 1/4	
1 7/8	6.00	12.00	3 1/2	1	No. 11	4 1/2	25.90	92.00	5 1/2	2 1/4	No. 13
1 1 1/8	6.30	12.75	3 1/2	1		4 3/8	27.40	98.50	5 1/2	2 1/4	
2	6.60	13.50	3 1/2	1		4 1/2	29.30	105.00	6	2 1/2	
2 1/16	6.95	14.25	3 3/4	1 1/4	No. 12	4 3/4	31.20	111.50	6	2 1/2	No. 14
2 1/8	7.30	15.00	3 3/4	1 1/4		4 1/2	33.10	118.00	6	2 1/2	
2 3/16	7.65	15.75	3 3/4	1 1/4		4 7/8	35.00	125.00	6	2 1/2	
2 1/4	8.00	16.50	3 3/4	1 1/4	No. 13	5	37.40	132.50	6	2 1/2	No. 14
2 1/2	8.35	17.25	3 3/4	1 1/4		5 1/8	39.80	140.00	6	2 1/2	
2 3/8	8.70	18.00	3 3/4	1 1/4		5 1/4	42.20	147.50	6	2 1/2	
2 1/2	9.05	18.75	3 3/4	1 1/4	No. 14	5 3/8	44.60	155.00	6	2 1/2	No. 15
2 1/2	9.40	19.50	3 3/4	1 1/4		5 1/2	47.60	163.75	6 1/2	2 3/4	
2 5/8	9.80	20.50	4	1 1/2		5 3/4	50.60	172.50	6 1/2	2 3/4	
2 3/4	10.20	21.75	4	1 1/2	No. 15	5 7/8	53.60	181.25	6 1/2	2 3/4	No. 15
2 1 1/8	10.60	23.00	4	1 1/2		6	56.60	190.00	6 1/2	2 3/4	

Thirty-second sizes not listed from 1/2 inch to 2 inch take list and arbor of next larger size.

For Shell Reamer Arbors see pages 68 and 69.

All sizes and dimensions not listed are special and subject to special prices.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

**Arbors for Shell Reamers****No. 120T Taper Shank**

Size	Price Each	Fitting Sizes Ins.	Length Over All Ins.	Shank Taper
No. 3	\$2.90	$\frac{1}{2}$ to $\frac{5}{8}$	8	No. 1
4	3.25	$\frac{41}{64}$ to $\frac{3}{4}$	9	No. 2
5	3.60	$\frac{49}{64}$ to 1	$9\frac{1}{2}$	
6	3.95	$1\frac{1}{64}$ to $1\frac{1}{4}$	10	No. 3
7	4.30	$1\frac{17}{64}$ to $1\frac{5}{8}$	11	
8	4.80	$1\frac{41}{64}$ to 2	12	No. 4
9	5.40	$2\frac{1}{64}$ to $2\frac{1}{2}$	13	
10	6.30	$2\frac{33}{64}$ to 3	14	No. 5
11	9.00	$3\frac{1}{64}$ to $3\frac{1}{2}$	15	
12	12.60	$3\frac{33}{64}$ to 4	16	
13	16.20	$4\frac{1}{64}$ to $4\frac{1}{2}$	17	
14	21.60	$4\frac{33}{64}$ to $5\frac{1}{2}$	18	
15	26.40	$5\frac{33}{64}$ to $6\frac{1}{2}$	19		No. 6

Arbors for Shell Reamers**No. 120J Straight Shank**

Size	Price Each	Fitting Sizes Ins.	Length Over All, Ins.	Size	Price Each	Fitting Sizes Ins.	Length Over All, Ins.
No. 3	\$2.40	$\frac{1}{2}$ to $\frac{5}{8}$	8	No. 10	\$5.25	$2\frac{33}{64}$ to 3	14
4	2.70	$\frac{41}{64}$ to $\frac{3}{4}$	9	11	7.50	$3\frac{1}{64}$ to $3\frac{1}{2}$	15
5	3.00	$\frac{49}{64}$ to 1	$9\frac{1}{2}$	12	10.50	$3\frac{33}{64}$ to 4	16
6	3.30	$1\frac{1}{64}$ to $1\frac{1}{4}$	10	13	13.50	$4\frac{1}{64}$ to $4\frac{1}{2}$	17
7	3.60	$1\frac{17}{64}$ to $1\frac{5}{8}$	11	14	18.00	$4\frac{33}{64}$ to $5\frac{1}{2}$	18
8	4.00	$1\frac{41}{64}$ to 2	12	15	22.00	$5\frac{33}{64}$ to $6\frac{1}{2}$	19
9	4.50	$2\frac{1}{64}$ to $2\frac{1}{2}$	13				

For Shell Drills and Reamers see pages 66, 67 and 79.

All sizes and dimensions not listed are special and subject to special prices.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

"Diamond" Easy Starting Arbors

FOR SHELL REAMERS

Patented December 15, 1908



No. 125A Taper Shank



No. 125 Straight Shank

Size	Price No. 125A Taper Shank	Price No. 125 Straight Shank	Fitting Sizes Ins.	Length Over All Ins.	Taper Shank
No. 3	\$4.35	\$3.60	$\frac{1}{2}$ to $\frac{5}{8}$	8	No. 1
4	4.90	4.05	$\frac{41}{64}$ to $\frac{3}{4}$	9	No. 2
5	5.40	4.50	$\frac{49}{64}$ to 1	$9\frac{1}{2}$	
6	5.95	4.95	$1\frac{1}{64}$ to $1\frac{1}{4}$	10	No. 3
7	6.45	5.40	$1\frac{17}{64}$ to $1\frac{5}{8}$	11	
8	7.20	6.00	$1\frac{41}{64}$ to 2	12	No. 4
9	8.10	6.75	$2\frac{1}{64}$ to $2\frac{1}{2}$	13	
10	9.45	7.90	$2\frac{33}{64}$ to 3	14	No. 5
11	13.50	11.25	$3\frac{1}{64}$ to $3\frac{1}{2}$	15	
12	18.90	15.75	$3\frac{33}{64}$ to 4	16	
13	24.30	20.25	$4\frac{1}{64}$ to $4\frac{1}{2}$	17	
14	32.40	27.00	$4\frac{33}{64}$ to $5\frac{1}{2}$	18	
15	39.60	33.00	$5\frac{33}{64}$ to $6\frac{1}{2}$	19		No. 6

"Diamond" Easy Starting Arbors are made with a nut and sliding collar, the nut being used to move the collar forward and start the reamer or shell tool from the arbor. It is not necessary to remove the arbor from the machine.

This device is a time saver and likewise prevents damaging the tools.

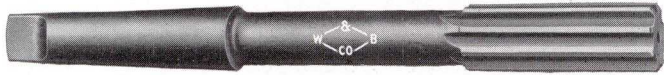
For Shell Drills and Reamers see pages 66, 67 and 79.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Fluted Chucking Reamers

(ECCENTRIC FLUTES)
WITH TAPER SHANKS



No. 120E Carbon Steel

No. 262 "Diamond" High Speed

Diameter Inches	PRICE EACH		Length Over All Inches	Length of Flute Inches	Shank Taper
	Carbon Steel	High Speed			
1/4	\$1.45	\$ 3.50	6	1 1/2	No. 1
5/16	1.55	3.75	6	1 1/2	
3/8	1.75	4.25	7	1 3/4	
7/16	1.90	4.75	7	1 3/4	
1/2	2.15	5.25	8	2	
9/16	2.40	5.75	8	2	No. 2
5/8	2.70	6.25	9	2 1/4	
11/16	2.90	6.75	9	2 1/4	
3/4	3.05	7.25	9 1/2	2 1/2	
13/16	3.35	8.00	9 1/2	2 1/2	
7/8	3.60	9.00	10	2 5/8	No. 3
15/16	3.90	10.00	10	2 5/8	
1	4.15	11.00	10 1/2	2 3/4	
1 1/16	4.45	12.25	10 1/2	2 3/4	
1 1/8	4.70	13.50	11	2 7/8	
1 3/16	5.00	14.75	11	2 7/8	No. 4
1 1/4	5.20	16.25	11 1/2	3	
1 5/16	5.50	18.00	11 1/2	3	
1 3/8	5.75	19.75	12	3 1/4	
1 7/16	6.05	21.50	12	3 1/4	
1 1/2	6.30	23.25	12 1/2	3 1/2	
1 9/16	6.60	25.00	12 1/2	3 1/2	
1 5/8	6.90	26.75	13	3 3/4	
1 11/16	7.20	28.50	13	3 3/4		No. 5
1 3/4	7.55	30.50	13 1/2	4	
1 13/16	7.90	32.50	13 1/2	4	
1 7/8	8.30	34.50	14	4 1/4	
1 15/16	8.65	36.75	14	4 1/4	
2	9.00	39.00	14	4 1/4	

Thirty-second sizes not listed from 1/4 to 1 1/4 inch take list of next larger size.
All sizes and dimensions not listed are special and subject to special prices.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

Fluted Chucking Reamers

(ECCENTRIC FLUTES)
WITH STRAIGHT SHANK



No. 120F Carbon Steel

No. 263 "Diamond" High Speed

Diameter Inches	PRICE EACH		Length Over All Inches	Length of Flute Inches
	Carbon Steel	High Speed		
1/4	\$1.20	\$3.00	6	1 1/2
5/16	1.30	3.25	6	1 1/2
3/8	1.45	3.75	7	1 3/4
7/16	1.60	4.25	7	1 3/4
1/2	1.80	4.75	8	2
9/16	2.00	5.25	8	2
5/8	2.25	5.75	9	2 1/4
11/16	2.40	6.25	9	2 1/4
3/4	2.55	6.75	9 1/2	2 1/2
13/16	2.80	7.25	9 1/2	2 1/2
7/8	3.00	8.00	10	2 5/8
15/16	3.25	9.00	10	2 5/8
1	3.45	10.00	10 1/2	2 3/4
1 1/16	3.70	11.25	10 1/2	2 3/4
1 1/8	3.90	12.50	11	2 7/8
1 3/16	4.15	13.75	11	2 7/8
1 1/4	4.35	15.25	11 1/2	3
1 5/16	4.60	17.00	11 1/2	3
1 3/8	4.80	18.75	12	3 1/4
1 7/16	5.05	20.50	12	3 1/4
1 1/2	5.25	22.25	12 1/2	3 1/2
1 9/16	5.50	24.00	12 1/2	3 1/2
1 5/8	5.75	25.75	13	3 3/4
1 11/16	6.00	27.50	13	3 3/4
1 3/4	6.30	29.50	13 1/2	4
1 13/16	6.60	31.50	13 1/2	4
1 7/8	6.90	33.50	14	4 1/4
1 15/16	7.20	35.75	14	4 1/4
2	7.50	38.00	14	4 1/4

Thirty-second sizes not listed from 1/4 to 1 1/4 inch take list of next larger size.
All sizes and dimensions not listed are special and subject to special prices.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

**Rose Checking Reamers**

WITH TAPER SHANKS



No. 120G Carbon Steel

No. 264 "Diamond" High Speed

Diameter Inches	PRICE EACH		Length Over All Inches	Length of Flute Inches	Shank Taper
	Carbon Steel	High Speed			
$\frac{1}{4}$	\$1.45	\$3.50	6	$1\frac{1}{2}$	No. 1
$\frac{5}{16}$	1.55	3.75	6	$1\frac{1}{2}$	
$\frac{3}{8}$	1.75	4.25	7	$1\frac{3}{4}$	
$\frac{7}{16}$	1.90	4.75	7	$1\frac{3}{4}$	
$\frac{1}{2}$	2.15	5.25	8	2	
$\frac{9}{16}$	2.40	5.75	8	2	
$\frac{5}{8}$	2.70	6.25	9	$2\frac{1}{4}$	No. 2
$\frac{11}{16}$	2.90	6.75	9	$2\frac{1}{4}$	
$\frac{3}{4}$	3.05	7.25	$9\frac{1}{2}$	$2\frac{1}{2}$	
$\frac{13}{16}$	3.35	8.00	$9\frac{1}{2}$	$2\frac{1}{2}$	
$\frac{7}{8}$	3.60	9.00	10	$2\frac{5}{8}$	
$\frac{15}{16}$	3.90	10.00	10	$2\frac{5}{8}$		No. 3
1	4.15	11.00	$10\frac{1}{2}$	$2\frac{3}{4}$	
$1\frac{1}{16}$	4.45	12.25	$10\frac{1}{2}$	$2\frac{3}{4}$	
$1\frac{1}{8}$	4.70	13.50	11	$2\frac{7}{8}$	
$1\frac{3}{16}$	5.00	14.75	11	$2\frac{7}{8}$	
$1\frac{1}{4}$	5.20	16.25	$11\frac{1}{2}$	3	No. 4
$1\frac{5}{16}$	5.50	18.00	$11\frac{1}{2}$	3	
$1\frac{3}{8}$	5.75	19.75	12	$3\frac{1}{4}$	
$1\frac{7}{16}$	6.05	21.50	12	$3\frac{1}{4}$	
$1\frac{1}{2}$	6.30	23.25	$12\frac{1}{2}$	$3\frac{1}{2}$	
$1\frac{9}{16}$	6.60	25.00	$12\frac{1}{2}$	$3\frac{1}{2}$	
$1\frac{5}{8}$	6.90	26.75	13	$3\frac{3}{4}$	No. 5
$1\frac{11}{16}$	7.20	28.50	13	$3\frac{3}{4}$	
$1\frac{3}{4}$	7.55	30.50	$13\frac{1}{2}$	4	
$1\frac{13}{16}$	7.90	32.50	$13\frac{1}{2}$	4	
$1\frac{7}{8}$	8.30	34.50	14	$4\frac{1}{4}$	
$1\frac{15}{16}$	8.65	36.75	14	$4\frac{1}{4}$	
2	9.00	39.00	14	$4\frac{1}{4}$	

Thirty-second sizes not listed from $\frac{1}{4}$ to $1\frac{1}{4}$ inch take list of next larger size.
All sizes and dimensions not listed are special and subject to special prices.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

Rose Chucking Reamers

WITH STRAIGHT SHANKS



No. 120H Carbon Steel

No. 265 "Diamond" High Speed.

Diameter Inches	PRICE EACH		Length Over All Inches	Length of Flute Inches
	Carbon Steel	High Speed		
1/4	\$1.20	\$3.00	6	1 1/2
5/16	1.30	3.25	6	1 1/2
3/8	1.45	3.75	7	1 3/4
7/16	1.60	4.25	7	1 3/4
1/2	1.80	4.75	8	2
9/16	2.00	5.25	8	2
5/8	2.25	5.75	9	2 1/4
11/16	2.40	6.25	9	2 1/4
3/4	2.55	6.75	9 1/2	2 1/2
13/16	2.80	7.25	9 1/2	2 1/2
7/8	3.00	8.00	10	2 5/8
15/16	3.25	9.00	10	2 5/8
1	3.45	10.00	10 1/2	2 3/4
1 1/16	3.70	11.25	10 1/2	2 3/4
1 1/8	3.90	12.50	11	2 7/8
1 3/16	4.15	13.75	11	2 7/8
1 1/4	4.35	15.25	11 1/2	3
1 5/16	4.60	17.00	11 1/2	3
1 3/8	4.80	18.75	12	3 1/4
1 7/16	5.05	20.50	12	3 1/4
1 1/2	5.25	22.25	12 1/2	3 1/2
1 9/16	5.50	24.00	12 1/2	3 1/2
1 5/8	5.75	25.75	13	3 3/4
1 11/16	6.00	27.50	13	3 3/4
1 3/4	6.30	29.50	13 1/2	4
1 13/16	6.60	31.50	13 1/2	4
1 7/8	6.90	33.50	14	4 1/4
1 15/16	7.20	35.75	14	4 1/4
2	7.50	38.00	14	4 1/4

Thirty-second sizes not listed from 1/4 to 1 1/4 inch take list of next larger size.

All sizes and dimensions not listed are special and subject to special prices.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Three Groove Chucking Reamers

WITH TAPER SHANKS



No. 120K Carbon Steel

No. 266 "Diamond" High Speed

Diameter Ins.	PRICE EACH		Length Over All Ins.	Length of Flute Ins.	Shank Taper	Diameter Ins.	PRICE EACH		Length Over All Ins.	Length of Flute Ins.	Shank Taper		
	Carbon Steel	High Speed					Carbon Steel	High Speed					
1/4	\$1.70	\$4.00	6 1/8	3	No. 1	1 1/8	\$4.00	\$13.75	11 3/4	7 1/4	No. 3		
9/32	1.70	4.25	6 1/4	3 1/16		1 5/32	4.25	15.25	11 7/8	7 3/8			
5/16	1.70	4.25	6 3/8	3 1/8		1 3/16	4.50	15.25	12	7 1/2			
3/8	1.70	4.75	6 1/2	3 5/16		1 7/32	4.65	16.75	12 1/8	7 5/8			
7/16	1.70	4.75	6 3/4	3 9/16		1 1/4	4.80	16.75	12 1/2	8			
1/2	1.75	5.25	7	3 13/16		No. 2	1 9/32	5.00	18.25	14 1/8		8 1/2	No. 4
5/8	1.80	5.25	7 1/4	4 1/16			1 5/16	5.20	18.25	14 1/4		8 5/8	
3/4	1.85	5.75	7 1/2	4 3/8			1 1/2	5.40	19.75	14 3/8		8 3/4	
7/8	1.90	5.75	7 3/4	4 5/8			1 5/8	5.60	19.75	14 1/2		8 7/8	
1	1.95	6.25	8	4 7/8			1 3/4	5.80	21.50	14 5/8		9	
1 1/16	2.00	6.25	8 1/4	5 1/8			1 7/8	6.00	21.50	14 3/4		9 1/8	
1 1/8	2.30	6.75	8 1/2	4 7/8			1 15/16	6.20	23.25	14 7/8		9 1/4	
1 1/4	2.60	6.75	8 3/4	5 1/16			1 1/2	6.40	23.25	15		9 3/8	
1 1/2	2.70	7.25	9	5 5/16			1 5/8	6.65	25.00	15 1/8		9 1/2	
1 3/4	2.75	7.25	9 1/4	5 1/2			1 3/4	6.90	25.00	15 1/4		9 5/8	
1 7/8	2.85	7.75	9 1/2	5 3/4			1 7/8	7.15	26.75	15 3/8		9 3/4	
2	2.90	7.75	9 3/4	6	1 15/16		7.40	26.75	15 1/2	9 7/8			
2 1/16	3.00	8.50	9 7/8	6 3/16	1 1/2		7.65	28.50	15 5/8	10			
2 1/8	3.05	8.50	10	6 1/8	1 1/4		7.90	28.50	15 3/4	10 1/8			
2 1/4	3.15	9.50	10 1/4	6 9/16	1 3/4		8.15	30.50	15 7/8	10 1/4			
2 1/2	3.20	9.50	10 1/2	6 1/2	1 3/8		8.40	30.50	16	10 1/4			
2 3/4	3.30	10.50	10 5/8	6 15/16	1 1/2	8.60	32.50	16 1/8	10 1/4				
2 7/8	3.40	10.50	10 3/4	6 1/4	1 1/2	8.80	32.50	16 1/4	10 3/8				
3	3.50	11.50	10 7/8	6 3/8	1 1/2	9.00	34.50	16 3/8	10 1/2				
3 1/16	3.60	11.50	11	6 1/2	1 7/8	9.20	34.50	16 1/2	10 9/16				
3 1/8	3.70	12.50	11 1/8	6 5/8	1 3/4	9.35	36.75	16 1/2	10 9/16				
3 1/4	3.80	12.50	11 1/4	6 3/4	1 1/2	9.50	36.75	16 1/2	10 9/16				
3 1/2	3.90	13.75	11 1/2	7	1 3/4	9.65	39.00	16 1/2	10 9/16				
3 3/4					2	9.80	39.00	16 1/2	10 9/16				

All sizes and dimensions not listed are special and subject to special prices.

These Reamers are specially designed for enlarging cored or drilled holes, and being ground to size on centers need not be followed by finishing reamer unless extreme accuracy is desired.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

Three Groove Chucking Reamers

WITH STRAIGHT SHANKS



No. 120N Carbon Steel

No. 267 "Diamond" High Speed

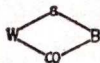
For Screw or Chucking Machines

Diameter Ins.	PRICE EACH		Length Over All Ins.	Length of Flute Ins.	Shank Dia. Ins.	Diameter Ins.	PRICE EACH		Length Over All Ins.	Length of Flute Ins.	Shank Dia. Ins.
	Carbon Steel	High Speed					Carbon Steel	High Speed			
1/4	\$1.70	\$4.00	6 1/8	3 7/8	1/4	1 1/16	\$3.80	\$12.50	11 1/4	7 3/4	1/4
5/16	1.70	4.25	6 1/4	4		1 3/32	3.90	13.75	11 1/2	8	
3/8	1.70	4.25	6 3/8	4 1/8		1 1/8	4.00	13.75	11 3/4	8 1/4	
7/16	1.70	4.75	6 1/2	4 1/4		1 5/32	4.25	15.25	11 7/8	8 3/8	
3/8	1.70	4.75	6 3/4	4 1/4	3/8	1 3/16	4.50	15.25	12	8 1/2	3/8
7/16	1.75	5.25	7	4 1/2		1 7/32	4.65	16.75	12 1/8	8 5/8	
1/2	1.80	5.25	7 1/4	4 3/4		1 1/4	4.80	16.75	12 1/2	8 3/4	
9/16	1.85	5.75	7 1/2	5		1 3/32	5.00	18.25	14 1/8	10 3/8	
5/8	1.90	5.75	7 3/4	5	1/2	1 9/32	5.20	18.25	14 1/4	10 1/2	1/2
11/16	1.95	6.25	8	5 1/4		1 11/32	5.40	19.75	14 3/8	10 5/8	
3/4	2.00	6.25	8 1/4	5 1/2		1 3/8	5.60	19.75	14 1/2	10 3/4	
7/8	2.30	6.75	8 1/2	5 3/4		1 5/16	5.80	21.50	14 5/8	10 7/8	
5/8	2.60	6.75	8 3/4	5 3/4	5/8	1 1/2	6.00	21.50	14 3/4	11	5/8
11/16	2.70	7.25	9	6		1 15/32	6.20	23.25	14 7/8	11 1/8	
3/4	2.75	7.25	9 1/4	6 1/4		1 7/16	6.40	23.25	15	11 1/4	
7/8	2.85	7.75	9 1/2	6 1/2		1 9/16	6.65	25.00	15 1/8	11 3/8	
3/4	2.90	7.75	9 3/4	6 3/4	3/4	1 1/2	6.90	25.00	15 1/4	11 5/8	3/4
11/16	3.00	8.50	9 7/8	6 7/8		1 13/32	7.15	26.75	15 1/2	11 3/4	
1 1/16	3.05	8.50	10	7		1 5/8	7.40	26.75	15 3/8	11 7/8	
1 1/8	3.15	9.50	10 1/4	7 1/4		1 21/32	7.65	28.50	15 1/2	12	
7/8	3.20	9.50	10 1/2	7 1/4	7/8	1 11/16	7.90	28.50	15 5/8	11 7/8	7/8
1 1/8	3.30	10.50	10 5/8	7 3/8		1 13/16	8.15	30.50	15 3/4	12	
1 1/4	3.40	10.50	10 3/4	7 1/2		1 3/4	8.40	30.50	15 7/8	12	
1 1/2	3.50	11.50	10 7/8	7 5/8		1 25/32	8.60	32.50	16	12 1/8	
1	3.60	11.50	11	7 1/2	1	1 13/16	8.80	32.50	16 1/8	12 1/8	1
1 1/32	3.70	12.50	11 1/8	7 5/8		1 27/32	9.00	34.50	16 1/4	12 3/8	
						1 7/8	9.20	34.50	16 1/2	12 1/4	
						1 29/32	9.35	36.75	16 1/2	12 1/4	
					1 15/16	9.50	36.75	16 1/2	12 1/4		
					1 31/32	9.65	39.00	16 1/2	12 1/4		
					2	9.80	39.00	16 1/2	12 1/8		

All sizes and dimensions not listed are special and subject to special prices.

These Reamers are specially designed for enlarging cored or drilled holes, and being ground to size on centers need not be followed by finishing reamer unless extreme accuracy is desired.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Taper or Rod Reamers

TAPER SHANKS
FOR LOCOMOTIVE WORK



No. 124 Taper Shank

No. 224 "Diamond" High Speed

REGULAR TAPER $\frac{1}{16}$ INCH PER FOOT

Diameter Inches Small End	PRICE EACH		Length Over All Inches	Length of Flute Inches	Shank Taper
	Carbon Steel	High Speed Steel			
$\frac{1}{4}$	\$3.10	\$6.00	$7\frac{3}{16}$	4	No. 1
$\frac{9}{32}$	3.10	6.25	$7\frac{3}{16}$	4	
$\frac{5}{16}$	3.15	6.50	$7\frac{3}{16}$	4	
$\frac{11}{32}$	3.15	6.75	$7\frac{3}{16}$	4	
$\frac{3}{8}$	3.20	7.00	$8\frac{3}{16}$	5	
$\frac{13}{32}$	3.25	7.25	$8\frac{3}{16}$	5	
$\frac{7}{16}$	3.30	7.50	$9\frac{3}{16}$	6	
$\frac{15}{32}$	3.45	7.75	$9\frac{3}{16}$	6	
$\frac{1}{2}$	3.50	8.00	$10\frac{5}{16}$	7	
$\frac{9}{16}$	3.50	8.75	$11\frac{5}{16}$	8	
$\frac{5}{8}$	4.00	9.50	12	8	No. 2
$\frac{11}{16}$	4.50	10.25	12	8	
$\frac{3}{4}$	4.90	11.00	12	8	
$\frac{13}{16}$	5.30	12.00	$13\frac{1}{8}$	9	
$\frac{7}{8}$	5.70	13.00	$13\frac{1}{8}$	9	
$\frac{15}{16}$	6.05	14.00	$13\frac{7}{8}$	9	No. 3
1	6.40	15.50	$13\frac{7}{8}$	9	
$1\frac{1}{16}$	6.60	17.00	$13\frac{7}{8}$	9	
$1\frac{1}{8}$	6.80	18.50	$14\frac{7}{8}$	10	
$1\frac{3}{16}$	7.25	20.00	$14\frac{7}{8}$	10	
$1\frac{1}{4}$	7.70	22.00	16	10	No. 4
$1\frac{5}{16}$	8.35	24.00	18	12	
$1\frac{3}{8}$	8.80	26.00	18	12	
$1\frac{7}{16}$	9.35	28.00	18	12	
$1\frac{1}{2}$	9.90	30.00	18	12	
$1\frac{9}{16}$	10.55	32.50	20	14	
$1\frac{5}{8}$	11.20	35.00	20	14	
$1\frac{11}{16}$	11.95	38.00	20	14	
$1\frac{3}{4}$	12.75	41.00	$21\frac{1}{4}$	14	No. 5
$1\frac{13}{16}$	13.65	44.00	$23\frac{1}{4}$	16	
$1\frac{7}{8}$	14.60	47.00	$23\frac{1}{4}$	16	
$1\frac{15}{16}$	15.70	51.00	$23\frac{1}{4}$	16	
2	16.80	55.00	$23\frac{1}{4}$	16	

All sizes, dimensions and tapers per foot not listed are special and subject to special prices.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

Taper or Rod Reamers

FOR LOCOMOTIVE WORK



No. 120A Carbon Steel
No. 220 "Diamond" High Speed
 REGULAR TAPER $\frac{1}{16}$ INCH PER FOOT

Diameter Inches Small End	PRICE EACH		Length Over All Inches	Length of Flute Inches
	Carbon Steel	High Speed Steel		
$\frac{1}{4}$	\$2.20	\$5.00	$5\frac{5}{16}$	4
$\frac{9}{32}$	2.20	5.20	$5\frac{5}{16}$	4
$\frac{5}{16}$	2.25	5.40	$5\frac{5}{16}$	4
$\frac{11}{32}$	2.25	5.60	$5\frac{5}{16}$	4
$\frac{3}{8}$	2.30	5.80	$6\frac{5}{16}$	5
$\frac{13}{32}$	2.40	6.00	$6\frac{5}{16}$	5
$\frac{7}{16}$	2.55	6.20	$7\frac{5}{16}$	6
$\frac{15}{32}$	2.70	6.40	$7\frac{5}{16}$	6
$\frac{1}{2}$	3.00	6.60	$8\frac{5}{8}$	7
$\frac{9}{16}$	3.20	7.10	$9\frac{7}{8}$	8
$\frac{5}{8}$	3.50	7.60	$9\frac{7}{8}$	8
$\frac{11}{16}$	3.80	8.25	$9\frac{7}{8}$	8
$\frac{3}{4}$	4.10	9.00	$9\frac{7}{8}$	8
$\frac{13}{16}$	4.50	10.00	$11\frac{1}{4}$	9
$\frac{7}{8}$	4.80	11.00	$11\frac{1}{4}$	9
$\frac{15}{16}$	5.10	12.00	$11\frac{1}{4}$	9
1	5.40	13.00	$11\frac{1}{4}$	9
$1\frac{1}{16}$	5.70	14.50	$11\frac{1}{4}$	9
$1\frac{1}{8}$	6.20	16.00	$12\frac{1}{4}$	10
$1\frac{3}{16}$	6.60	17.50	$12\frac{1}{4}$	10
$1\frac{1}{4}$	7.00	19.00	$12\frac{1}{4}$	10
$1\frac{5}{16}$	7.60	20.75	$14\frac{1}{2}$	12
$1\frac{3}{8}$	8.00	22.50	$14\frac{1}{2}$	12
$1\frac{7}{16}$	8.50	24.50	$14\frac{1}{2}$	12
$1\frac{1}{2}$	9.00	26.50	$14\frac{1}{2}$	12
$1\frac{9}{16}$	9.60	29.00	$16\frac{1}{2}$	14
$1\frac{5}{8}$	10.20	31.50	$16\frac{1}{2}$	14
$1\frac{11}{16}$	10.85	34.00	$16\frac{1}{2}$	14
$1\frac{3}{4}$	11.60	36.50	$16\frac{1}{2}$	14
$1\frac{13}{16}$	12.40	39.00	$18\frac{1}{2}$	16
$1\frac{7}{8}$	14.00	42.00	$18\frac{1}{2}$	16
$1\frac{15}{16}$	15.00	46.00	$18\frac{1}{2}$	16
2	16.00	50.00	$18\frac{1}{2}$	16

All sizes, dimensions and tapers per foot not listed are special and subject to special prices.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Taper Pin Reamers

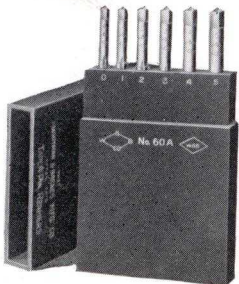
**No. 120D****Taper 1/4-Inch Per Foot**

Size No.	Price Each	Diameter at Small End, Inches	Length of Flute Inches	Length Over All Inches
000	\$1.50	.101	1 3/8	2
00	1.35	.114	1 1/2	2 1/4
0	1.00	.127	1 5/8	2 3/8
1	1.00	.146	1 3/4	2 1/2
2	1.25	.162	2	3
3	1.50	.183	2 1/4	3 1/2
4	1.75	.208	2 1/2	4
5	2.00	.240	3	4 1/2
6	2.25	.279	3 5/8	5
7	2.50	.331	4 1/2	6
8	3.00	.398	5 1/4	6 3/4
9	3.50	.482	6 1/8	8
10	4.50	.581	7	9
11	6.00	.706	8 1/4	11 1/4
12	7.50	.842	10	13 3/8
13	9.00	1.009	12	16
14	11.00	1.250	14	18 1/4

These Reamers all have the same Taper and the point of each will enter the hole reamed by the next size smaller.

Sizes 000 to No. 6 inclusive packed singly in envelopes, one dozen envelopes in a package.

All sizes, dimensions and styles not listed are special and subject to special prices.



"W. & B." Taper Pin Reamer Sets

Set No. 60A contains one each Taper Pin Reamers Nos. 0-1-2-3-4-5. Price, Per Set, \$9.50.

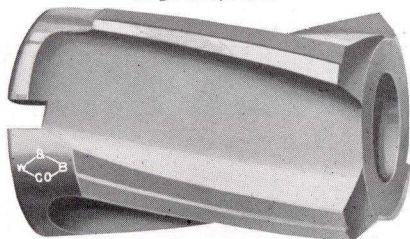
Packed in a neat cloth covered case which keeps the Reamers clean and in good condition and which fits the pocket.

Size of each Reamer stamped in gold on the case.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

Shell Drills

Angle of Spiral 15°



No. 128 Carbon Steel

No. 428 "Diamond" High Speed

These Drills take the Arbors shown on page 69, the same as Shell Reamers.

PRICES QUOTED ON REQUEST

Taper Reamers for Drill Sockets



No. 118 Finishing Reamer



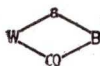
No. 118A Roughing Reamer

No. of Taper	PRICE EACH		Diameter Small End Inches	Diameter Large End Inches	Length Over All Inches	Length of Flute Inches	Taper per foot Inches
	Finishing	Roughing					
0	\$1.60	\$1.90	.250	.367	3 $\frac{3}{4}$	2 $\frac{1}{4}$	0.625
1	2.00	2.40	.367	.517	5 $\frac{1}{2}$	3	0.600
2	2.60	3.10	.569	.745	7	3 $\frac{1}{2}$	0.602
3	3.40	4.10	.775	.988	8	4 $\frac{1}{4}$	0.602
4	4.20	5.05	1.017	1.289	9	5 $\frac{1}{4}$	0.623
5	6.60	7.90	1.471	1.799	10	6 $\frac{1}{4}$	0.630
6	12.00	14.40	2.112	2.555	12	8 $\frac{1}{2}$	0.626
7	35.00	42.00	2.746	3.371	16	12	0.625

No. 118A Roughing Reamers are made .010 inch smaller in diameter than Finishing Reamers.

All sizes and dimensions not listed are special and subject to special prices.

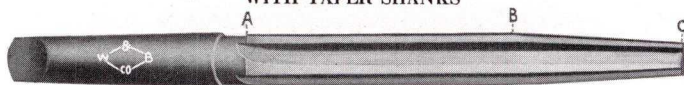
ALWAYS GIVE LIST NUMBER WHEN ORDERING



Taper Bridge Reamers

(AIR DRILL)

WITH TAPER SHANKS



No. 120L Carbon Steel

No. 268 "Diamond" High Speed

FOR BOILER MAKERS, STRUCTURAL IRON, BRIDGE
AND SHIP BUILDERS

Diameter, Ins.			PRICE EACH		Length Over All Ins.	Length of Flute	Taper End Length Ins.	Shank Taper
A	B	C	Carbon Steel	High Speed				
1/4	1/4	5/32	\$2.30	\$3.00	6 3/8	3 1/8	1 1/4	No. 1
9/32	9/32	11/64	2.35	3.25	6 3/4	3 1/2	1 1/4	
5/16	5/16	3/8	2.40	3.25	6 3/4	3 1/2	1 1/4	
11/32	11/32	13/64	2.45	3.50	7 1/4	4	1 1/2	
3/8	3/8	7/32	2.50	3.50	7 1/4	4	1 1/2	
13/32	13/32	15/64	2.55	3.75	8 1/4	4 3/8	1 1/2	No. 2
7/16	7/16	1/4	2.60	3.75	8 1/4	4 3/8	1 1/2	
15/32	15/32	1/4	2.65	4.00	9	5 1/8	2	
1/2	1/2	1/4	2.75	4.00	9	5 1/8	2	
9/16	9/16	5/16	2.90	4.25	9	5 1/8	2	
5/8	5/8	1/2	3.05	4.50	10	6 1/8	2 1/2	No. 3
11/16	11/16	3/8	3.20	4.75	11	6 1/2	2 1/2	
3/4	3/4	7/16	3.35	5.00	12	7 3/8	3	
13/16	13/16	1/2	3.50	5.30	12	7 3/8	3	
7/8	7/8	9/16	3.75	5.70	12	7 3/8	3	
15/16	15/16	5/8	4.00	6.00	12	7 3/8	3	No. 3
1	1	11/16	4.25	6.50	12	7 3/8	3	
1 1/16	1 1/16	3/4	4.50	7.00	12	7 3/8	3	
1 1/8	1 1/8	13/16	4.75	7.50	12	7 3/8	3	
1 3/16	1 3/16	7/8	5.00	8.00	12	7 3/8	3	
1 1/4	1 1/4	15/16	5.50	8.75	12	7 3/8	3	No. 4
*1 1/4	1 1/4	15/16	5.50	8.75	12	7 3/8	3	
1 5/16	1 5/16	1	6.00	9.50	13	7 3/8	3	
1 3/8	1 3/8	1 1/16	6.50	10.50	13	7 3/8	3	
1 7/16	1 7/16	1 1/8	7.00	12.00	13	7 3/8	3	
1 1/2	1 1/2	1 3/16	8.00	14.00	13	7 3/8	3	

*One and one-fourth inch with either No. 3 or 4 shanks at regular prices. No. 3 shank furnished unless otherwise specified.

Reamers from 1/4 inch to 1 1/4 inch have five flutes, 1 1/8 to 1 1/2 inch have six flutes.

All sizes, dimensions and styles not listed are special and subject to special prices.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

Taper Bridge Reamers

WITH SQUARE SHANKS



No. 120C Carbon Steel

No. 268A "Diamond" High Speed

FOR BOILER MAKERS, STRUCTURAL IRON, BRIDGE
AND SHIP BUILDERS

DIAMETER, INCHES			PRICE EACH		Length Over All Ins.	Length of Flute Ins.	Tapered End Length Ins.
A	B	C	Carbon Steel	High Speed			
1/4	1/4	5/32	\$2.30	\$2.50	4 1/4	2 3/4	1
9/32	9/32	11/16	2.35	2.70	4 3/4	3	1
5/16	5/16	3/8	2.40	2.70	4 3/4	3	1
11/32	11/32	13/64	2.45	2.90	5 1/2	3 1/4	1 1/4
3 3/8	3 3/8	6 1/4	2.50	2.90	5 1/2	3 1/4	1 1/4
13/32	13/32	15/64	2.55	3.10	6 1/2	4	1 1/2
3 1/2	3 1/2	7/4	2.60	3.10	6 1/2	4	1 1/2
7/16	7/16	1/4	2.65	3.30	7 3/4	5 1/4	2
15/32	15/32	1/4	2.75	3.30	7 3/4	5 1/4	2
1 1/2	1 1/2	1/4	2.90	3.50	7 3/4	5 1/4	2
9/16	9/16	5/16	3.05	3.70	8 3/4	6 1/4	2 1/2
5 3/8	5 3/8	1 1/2	3.20	3.90	8 3/4	6 1/4	2 1/2
11/16	11/16	3 3/8	3.35	4.10	10 1/8	7 3/8	3
3 1/4	3 1/4	7/16	3.50	4.40	10 1/8	7 3/8	3
13/16	13/16	1/2	3.75	4.70	10 1/8	7 3/8	3
7 3/8	7 3/8	9/16	4.00	5.00	10 1/8	7 3/8	3
15/16	15/16	5 3/8	4.25	5.30	10 1/8	7 3/8	3
1	1	11/16	4.50	5.85	10 1/8	7 3/8	3
1 1/16	1 1/16	3 1/4	4.75	6.40	10 1/8	7 3/8	3
1 1/8	1 1/8	1 1/8	5.00	6.95	10 1/8	7 3/8	3
1 3/16	1 3/16	7 3/8	5.50	7.50	10 1/8	7 3/8	3
1 1/4	1 1/4	1 1/8	6.00	8.25	10 1/8	7 3/8	3
1 5/16	1 5/16	1	6.50	9.00	10 1/8	7 3/8	3
1 3/8	1 3/8	1 1/16	7.00	10.00	10 1/8	7 3/8	3
1 7/16	1 7/16	1 1/8	8.00	11.00	10 1/8	7 3/8	3
1 1/2	1 1/2	1 3/16			10 1/8	7 3/8	3

Reamers from 1/4 inch to 1 1/4 inch have five flutes, 1 5/8 to 1 1/2 inch have six flutes.

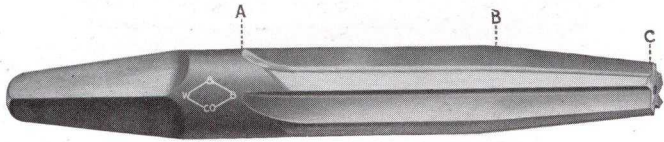
All sizes, dimensions and styles not listed are special and subject to special prices.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Taper Bridge Reamers

WITH TAPER SQUARE SHANKS FITTING RATCHETS



No. 127

Designed for use on Boilers, and Structural Iron Work where power is not available or the amount of work to be done is not sufficient to warrant rigging air tools.

DIAMETER AT			Price Each
A	B	C	
$\frac{9}{16}$	$\frac{9}{16}$	$\frac{5}{16}$	\$2.90
$\frac{11}{16}$	$\frac{11}{16}$	$\frac{3}{8}$	3.20
$\frac{13}{16}$	$\frac{13}{16}$	$\frac{1}{2}$	3.50
$\frac{15}{16}$	$\frac{15}{16}$	$\frac{5}{8}$	4.00
$1\frac{1}{16}$	$1\frac{1}{16}$	$\frac{3}{4}$	4.50

Length over all 7 inches. Length of Flute 5 inches. Length of Taper End 2 inches.
 Size of Shank $\frac{3}{8} \times \frac{5}{8} \times 1\frac{1}{2}$ inches.
 Shank size $\frac{1}{2} \times \frac{3}{4} \times 1\frac{3}{4}$ can be furnished if desired.

Center Reamers

60° ANGLE



STYLE A



STYLE B

No. 120M

Size Cut Inches	Diameter Shank Inches*	STYLE A		STYLE B	
		Price Each	Price Per Doz.	Price Each	Price Per Doz.
$\frac{1}{4}$	$\frac{3}{16}$	\$0.25	\$3.00	\$0.30	\$3.60
$\frac{3}{8}$	$\frac{1}{4}$	.30	3.60	.35	4.20
$\frac{1}{2}$	$\frac{3}{8}$	.35	4.20	.40	4.80
$\frac{5}{8}$	$\frac{3}{8}$	.60	7.20	.65	7.80
$\frac{3}{4}$	$\frac{1}{2}$	.80	9.60	.85	10.20

Packed: Sizes $\frac{1}{4}$ to $\frac{3}{8}$ inch, one dozen; $\frac{1}{2}$, $\frac{5}{8}$ and $\frac{3}{4}$ inch, one-half dozen of a size in a wood box.

These Reamers having 72° or 82° inclusive angle furnished at regular prices.

All sizes, dimensions and styles not listed are special and subject to special prices.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

Bit Stock Taper Reamers



No. 120B

Taper 1 inch to the foot; diameter at large end of flutes is $\frac{1}{16}$ -inch larger than nominal size.

Nominal Size Ins.	Price Each	Length Over All Ins.	Length of Flute Ins.	Nominal Size Ins.	Price Each	Length Over All Ins.	Length of Flute Ins.
$\frac{3}{16}$	\$0.60	$4\frac{1}{4}$	$2\frac{1}{4}$	$\frac{13}{16}$	\$1.50	$7\frac{5}{8}$	$3\frac{1}{2}$
$\frac{1}{4}$	.60	$4\frac{1}{2}$	$2\frac{1}{2}$	$\frac{7}{8}$	1.75	8	$3\frac{1}{2}$
$\frac{5}{16}$	.60	$4\frac{3}{4}$	$2\frac{1}{2}$	$\frac{9}{16}$	2.00	8	$3\frac{1}{2}$
$\frac{3}{8}$	.65	$5\frac{1}{8}$	$3\frac{1}{16}$	1	2.25	$8\frac{1}{8}$	$3\frac{1}{2}$
$\frac{7}{16}$	.70	$5\frac{1}{2}$	$3\frac{1}{16}$	$1\frac{1}{16}$	2.50	$8\frac{1}{2}$	$3\frac{3}{4}$
$\frac{1}{2}$	.75	$5\frac{7}{8}$	$3\frac{1}{16}$	$1\frac{1}{8}$	2.85	$8\frac{7}{8}$	$3\frac{3}{4}$
$\frac{9}{16}$	.80	$6\frac{1}{4}$	$3\frac{1}{16}$	$1\frac{3}{16}$	3.20	$9\frac{1}{4}$	$4\frac{1}{8}$
$\frac{5}{8}$	.95	$6\frac{5}{8}$	$3\frac{1}{16}$	$1\frac{1}{4}$	3.55	$9\frac{1}{4}$	$4\frac{1}{8}$
$\frac{11}{16}$	1.10	7	$3\frac{1}{16}$	$1\frac{3}{8}$	4.25	$9\frac{1}{4}$	$4\frac{1}{8}$
$\frac{3}{4}$	1.25	$7\frac{1}{4}$	$3\frac{1}{16}$	$1\frac{1}{2}$	5.00	$9\frac{1}{4}$	$4\frac{1}{8}$

Packed: Sizes $\frac{3}{16}$ to $\frac{5}{8}$ inch, one dozen; $\frac{11}{16}$ to 1 inch, one-half dozen of a size in a box. All sizes, dimensions and styles not listed are special and subject to special prices.

Bit Stock Taper Reamer Sets



No. 50



No. 51

For the convenience of the trade we furnish "Diamond" Bit Stock Taper Reamers packed in sets.

Set No. 50 contains one each $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{7}{16}$, $\frac{1}{2}$, $\frac{9}{16}$, $\frac{5}{8}$, $\frac{11}{16}$ and $\frac{3}{4}$ in. Price per set, \$8.25.

Set No. 50A contains one each $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{7}{16}$ and $\frac{1}{2}$ in. Price per set, \$3.75.

Sets Nos. 50 and 50A packed in neat wooden boxes with sliding covers.

Set No. 51 contains one each $\frac{1}{4}$, $\frac{3}{16}$, $\frac{3}{8}$, $\frac{7}{16}$, $\frac{1}{2}$, $\frac{9}{16}$, $\frac{5}{8}$, $\frac{11}{16}$ and $\frac{3}{4}$ in. Price per set, \$8.50.

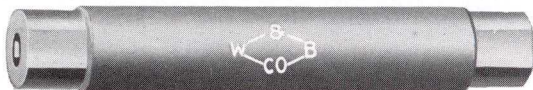
Set No. 51A contains one each $\frac{1}{4}$, $\frac{3}{16}$, $\frac{3}{8}$, $\frac{7}{16}$ and $\frac{1}{2}$ in. Price per set, \$4.00.

Sets Nos. 51 and 51A are packed in handsome polished oak boxes with hinged tops.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Hardened and Ground Lathe Mandrels



These Mandrels correspond in size to our Reamers, and will fit holes reamed by them. They are made of best quality tool steel, and are hardened and ground true to centers. The centers are not injured by driving. These Mandrels are slightly tapered, and the size of each is stamped at its larger end.

Diameter Inches	Price Each	Length Inches	Diameter Inches	Price Each	Length Inches
$\frac{1}{4}$	\$0.80	$3\frac{3}{4}$	$1\frac{5}{16}$	\$6.00	$10\frac{3}{4}$
$\frac{5}{16}$	.90	4	2	6.50	11
$\frac{3}{8}$	1.00	$4\frac{1}{4}$	$2\frac{1}{16}$	7.00	$11\frac{1}{2}$
$\frac{7}{16}$	1.10	$4\frac{1}{2}$	$2\frac{1}{8}$	7.50	$11\frac{1}{2}$
$\frac{1}{2}$	1.20	5	$2\frac{3}{16}$	8.00	12
$\frac{9}{16}$	1.30	$5\frac{1}{4}$	$2\frac{1}{4}$	8.50	12
$\frac{5}{8}$	1.40	$5\frac{1}{2}$	$2\frac{5}{16}$	9.00	12
$\frac{11}{16}$	1.50	$5\frac{3}{4}$	$2\frac{3}{8}$	9.50	12
$\frac{3}{4}$	1.60	6	$2\frac{7}{16}$	10.00	$12\frac{1}{2}$
$\frac{13}{16}$	1.70	$6\frac{1}{4}$	$2\frac{1}{2}$	10.50	$12\frac{1}{2}$
$\frac{7}{8}$	1.85	$6\frac{1}{2}$	$2\frac{9}{16}$	11.25	$12\frac{1}{2}$
$\frac{15}{16}$	2.00	$6\frac{3}{4}$	$2\frac{5}{8}$	12.00	$12\frac{1}{2}$
1	2.15	7	$2\frac{11}{16}$	12.75	13
$1\frac{1}{16}$	2.30	$7\frac{1}{4}$	$2\frac{3}{4}$	13.50	13
$1\frac{1}{8}$	2.45	$7\frac{1}{2}$	$2\frac{13}{16}$	14.25	13
$1\frac{3}{16}$	2.60	$7\frac{3}{4}$	$2\frac{7}{8}$	15.00	13
$1\frac{1}{4}$	2.80	8	$2\frac{15}{16}$	15.75	13
$1\frac{5}{16}$	3.00	$8\frac{1}{4}$	3	16.50	13
$1\frac{3}{8}$	3.25	$8\frac{1}{2}$	$3\frac{1}{8}$	18.00	14
$1\frac{7}{16}$	3.50	$8\frac{3}{4}$	$3\frac{1}{4}$	19.50	14
$1\frac{1}{2}$	3.75	9	$3\frac{3}{8}$	21.00	15
$1\frac{9}{16}$	4.00	$9\frac{1}{4}$	$3\frac{1}{2}$	23.00	15
$1\frac{5}{8}$	4.25	$9\frac{1}{2}$	$3\frac{5}{8}$	25.00	16
$1\frac{11}{16}$	4.50	$9\frac{3}{4}$	$3\frac{3}{4}$	27.00	16
$1\frac{3}{4}$	4.75	10	$3\frac{7}{8}$	29.00	17
$1\frac{13}{16}$	5.00	$10\frac{1}{4}$	4	31.00	17
$1\frac{7}{8}$	5.50	$10\frac{1}{2}$			

All sizes and dimensions not listed are special and subject to special prices.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

Drill List for Taps with V-Threads

Diameter of Tap	Threads Per In.	Size of Drill	Diameter of Tap	Threads Per In.	Size of Drill	Diameter of Tap	Threads Per In.	Size of Drill
$\frac{3}{32}$	48	50	$\frac{13}{32}$	16	P	$\frac{31}{32}$	9	$\frac{13}{16}$
$\frac{3}{32}$	56	49	$\frac{13}{32}$	18	$\frac{21}{64}$	1	8	$\frac{53}{64}$
$\frac{3}{32}$	60	48	$\frac{3}{7}$	14	R	$1\frac{1}{32}$	8	$\frac{55}{64}$
$\frac{7}{64}$	32	50	$\frac{7}{16}$	16	S	$1\frac{1}{16}$	8	$\frac{57}{64}$
$\frac{7}{64}$	36	49	$\frac{7}{16}$	14	$\frac{3}{8}$	$1\frac{3}{32}$	8	$\frac{64}{64}$
$\frac{7}{64}$	40	47	$\frac{15}{32}$	16	W	$1\frac{1}{8}$	7	$\frac{59}{64}$
$\frac{1}{8}$	32	44	$\frac{1}{2}$	12	$\frac{25}{64}$	$1\frac{1}{8}$	8	$\frac{64}{64}$
$\frac{1}{8}$	36	43	$\frac{1}{2}$	13	X	$1\frac{5}{32}$	7	$\frac{61}{64}$
$\frac{1}{8}$	40	42	$\frac{1}{2}$	14	$\frac{13}{32}$	$1\frac{3}{32}$	8	$\frac{64}{64}$
$\frac{9}{64}$	30	41	$\frac{3}{2}$	12	$\frac{27}{64}$	$1\frac{3}{16}$	7	$\frac{63}{64}$
$\frac{9}{64}$	32	40	$\frac{3}{2}$	13	$\frac{17}{64}$	$1\frac{3}{16}$	8	$\frac{64}{64}$
$\frac{9}{64}$	36	37	$\frac{3}{2}$	14	$\frac{7}{16}$	$1\frac{7}{32}$	7	$1\frac{1}{64}$
$\frac{5}{32}$	30	33	$\frac{3}{2}$	12	$\frac{29}{64}$	$1\frac{3}{32}$	8	$1\frac{3}{64}$
$\frac{5}{32}$	32	32	$\frac{9}{16}$	14	$\frac{15}{32}$	$1\frac{1}{4}$	7	$1\frac{3}{64}$
$\frac{5}{32}$	36	31	$\frac{19}{32}$	12	$\frac{31}{64}$	$1\frac{9}{32}$	7	$1\frac{5}{64}$
$\frac{3}{16}$	24	29	$\frac{19}{32}$	14	$\frac{1}{2}$	$1\frac{5}{16}$	7	$1\frac{7}{64}$
$\frac{3}{16}$	30	27	$\frac{5}{8}$	10	$\frac{11}{64}$	$1\frac{11}{32}$	7	$1\frac{9}{64}$
$\frac{3}{16}$	32	27	$\frac{5}{8}$	11	$\frac{1}{2}$	$1\frac{3}{8}$	6	$1\frac{1}{8}$
$\frac{7}{32}$	24	20	$\frac{5}{8}$	12	$\frac{33}{64}$	$1\frac{13}{32}$	6	$1\frac{5}{32}$
$\frac{7}{32}$	30	16	$\frac{21}{32}$	10	$\frac{35}{64}$	$1\frac{7}{16}$	6	$1\frac{7}{16}$
$\frac{7}{32}$	32	15	$\frac{21}{32}$	11	$\frac{17}{32}$	$1\frac{15}{32}$	6	$1\frac{7}{32}$
$\frac{1}{4}$	18	17	$\frac{21}{32}$	12	$\frac{35}{64}$	$1\frac{1}{2}$	6	$1\frac{3}{4}$
$\frac{1}{4}$	20	14	$\frac{3}{4}$	10	$\frac{39}{64}$	$1\frac{17}{32}$	6	$1\frac{19}{64}$
$\frac{1}{4}$	24	9	$\frac{3}{4}$	11	$\frac{5}{8}$	$1\frac{32}{64}$	5	$1\frac{21}{64}$
$\frac{9}{32}$	18	$\frac{13}{64}$	$\frac{3}{4}$	12	$\frac{41}{64}$	$1\frac{21}{32}$	5	$1\frac{23}{64}$
$\frac{9}{32}$	20	3	$\frac{25}{32}$	10	$\frac{41}{64}$	$1\frac{3}{4}$	5	$1\frac{29}{64}$
$\frac{5}{16}$	16	1	$\frac{25}{32}$	11	$\frac{21}{32}$	$1\frac{25}{32}$	5	$1\frac{31}{64}$
$\frac{5}{16}$	18	$\frac{15}{64}$	$\frac{32}{32}$	12	$\frac{32}{32}$	$1\frac{16}{16}$	5	$1\frac{33}{64}$
$\frac{5}{16}$	20	E	$\frac{13}{32}$	10	$\frac{43}{64}$	$1\frac{127}{64}$	5	$1\frac{35}{64}$
$\frac{11}{32}$	16	F	$\frac{16}{32}$	10	$\frac{45}{64}$	$1\frac{32}{32}$	5	$1\frac{35}{64}$
$\frac{11}{32}$	18	$\frac{17}{64}$	$\frac{7}{8}$	9	$\frac{23}{32}$	$1\frac{29}{32}$	$4\frac{1}{2}$	$1\frac{37}{64}$
$\frac{3}{8}$	14	J	$\frac{7}{8}$	10	$\frac{47}{64}$	$1\frac{15}{16}$	$4\frac{1}{2}$	$1\frac{39}{64}$
$\frac{3}{8}$	16	L	$\frac{29}{32}$	9	$\frac{5}{4}$	$1\frac{31}{32}$	$4\frac{1}{2}$	$1\frac{41}{64}$
$\frac{3}{8}$	18	$\frac{19}{64}$	$\frac{29}{32}$	10	$\frac{49}{64}$	2	$4\frac{1}{2}$	$1\frac{43}{64}$
$\frac{13}{32}$	14	N	$\frac{15}{16}$	9	$\frac{52}{32}$			$1\frac{43}{64}$



U. S. Standard



V-Thread



Whitworth



Drill List for Taps with U. S. Standard Threads

Size of Tap In.	Threads per In.	Size of Drill In.	Size of Tap In.	Threads per In.	Size of Drill In.	Size of Tap In.	Threads per In.	Size of Drill In.
1/4	20	3/16	7/8	9	47/64	1 7/8	5	1 5/8
5/16	18	C	1	8	62/32	2	4 1/2	1 23/32
3/8	16	N	1 1/8	7	61/64	2 1/8	4 1/2	1 27/32
7/16	14	S	1 1/4	7	1 5/64	2 1/4	4 1/2	1 31/32
1/2	13	13/32	1 3/8	6	1 11/64	2 3/8	4	2 1/16
9/16	12	32/64	1 1/2	6	1 19/64	2 1/2	4	2 3/16
5/8	11	33/64	1 5/8	5 1/2	1 25/64			
3/4	10	64/98	1 3/4	5	1 1/2			

For Machine Screw Taps

Size of Tap	Size of Drill for Outside Diam. of Screw	Size of Drill for Tapping Hole	Size of Tap	Size of Drill for Outside Diam. of Screw	Size of Drill for Tapping Hole	Size of Tap	Size of Drill for Outside Diam. of Screw	Size of Drill for Tapping Hole
2x48	44	50	9x24	16	30	16x16	I	12
2x56		49	9x28		28	16x18		8
2x64		48	9x30		28	16x20		7
			9x32		26	17x16	8	
3x40	39	49	10x24	11	26	17x18	L	4
3x48		47	10x30		24	17x20		3
3x56		45	10x32		24	18x16		2
4x32	33	46			6	21	18x18	19/64	2
4x36		44	11x24	20		18x20	1	
4x40		43	11x28	19		19x16	1	
			11x30			19x18	5/16	B
5x30	1/8	43	12x20	7/32	24	19x20	P	C
5x32		42	12x22		20	20x16		C
5x36		41	12x24		19	20x18		E
5x40		38	12x28		18	20x20		F
6x30	28	38	13x20	13/64	17	22x16	S	H
6x32		37	13x22		17	22x18		J
6x36		36	13x24		15	24x14		L
6x40		35			15	24x16		3/8	M
			14x20		24x18		N	
7x28	24	34	14x22	1/4	11	26x14	13/32	O
7x30		33	14x24		10	26x16		P
7x32		32				12		28x14	7/16	R
			15x18	F	10	28x16	29/64	S
8x24	19	31	15x20		8	30x14		U
8x30		31	15x22		7	30x16		V
8x32		30	15x24					

The U. S. Standard System of Bolts and Nuts

AS RECOMMENDED BY THE FRANKLIN INSTITUTE.

OF PHILADELPHIA, DECEMBER 15, 1864

Diameter of Bolt Ins.	No. of Threads Per In.	Diameter of Hole in Nut Ins.	Short Diam. of Nut* Ins.	Diameter of Bolt Ins.	No. of Threads Per In.	Diameter of Hole in Nut Ins.	Short Diam. of Nut* Ins.
$\frac{1}{4}$	20	.185	$\frac{1}{2}$	2	$4\frac{1}{2}$	1.712	$3\frac{1}{8}$
$\frac{5}{16}$	18	.240	$\frac{19}{32}$	$2\frac{1}{4}$	$4\frac{1}{2}$	1.962	$3\frac{1}{2}$
$\frac{3}{8}$	16	.294	$\frac{11}{16}$	$2\frac{1}{2}$	4	2.175	$3\frac{7}{8}$
$\frac{7}{16}$	14	.344	$\frac{25}{32}$	$2\frac{3}{4}$	4	2.425	$4\frac{1}{4}$
$\frac{1}{2}$	13	.400	$\frac{7}{8}$	3	$3\frac{1}{2}$	2.628	$4\frac{5}{8}$
$\frac{9}{16}$	12	.454	$\frac{31}{32}$	$3\frac{1}{4}$	$3\frac{1}{2}$	2.878	5
$\frac{5}{8}$	11	.507	$1\frac{1}{16}$	$3\frac{1}{2}$	$3\frac{1}{4}$	3.100	$5\frac{3}{8}$
$\frac{3}{4}$	10	.620	$1\frac{1}{4}$	$3\frac{3}{4}$	3	3.317	$5\frac{3}{4}$
$\frac{7}{8}$	9	.731	$1\frac{7}{16}$	4	3	3.566	$6\frac{1}{8}$
1	8	.837	$1\frac{5}{8}$	$4\frac{1}{4}$	$2\frac{7}{8}$	3.825	$6\frac{1}{2}$
$1\frac{1}{8}$	7	.940	$1\frac{11}{16}$	$4\frac{1}{2}$	$2\frac{3}{4}$	4.027	$6\frac{7}{8}$
$1\frac{1}{4}$	7	1.065	2	$4\frac{3}{4}$	$2\frac{5}{8}$	4.255	$7\frac{1}{4}$
$1\frac{3}{8}$	6	1.160	$2\frac{3}{16}$	5	$2\frac{1}{2}$	4.480	$7\frac{5}{8}$
$1\frac{1}{2}$	6	1.284	$2\frac{3}{8}$	$5\frac{1}{4}$	$2\frac{1}{2}$	4.730	8
$1\frac{5}{8}$	$5\frac{1}{2}$	1.389	$2\frac{9}{16}$	$5\frac{1}{2}$	$2\frac{3}{8}$	5.053	$8\frac{3}{8}$
$1\frac{3}{4}$	5	1.490	$2\frac{3}{4}$	$5\frac{3}{4}$	$2\frac{3}{8}$	5.203	$8\frac{3}{4}$
$1\frac{7}{8}$	5	1.615	$2\frac{1}{2}$	6	$2\frac{1}{4}$	5.423	$9\frac{1}{8}$

*Or size of wrench opening.

Drill List for Pipe Taps

Diameter of Tap or Size of Pipe	Diameter of Drill	Diameter of Tap or Size of Pipe	Diameter of Drill
$\frac{1}{8}$ - 27 threads	$\frac{21}{64}$	$1\frac{1}{4}$ $1\frac{1}{2}$	$1\frac{15}{32}$
$\frac{1}{4}$ - 18	$\frac{29}{64}$	$1\frac{1}{2}$	$1\frac{23}{32}$
$\frac{3}{8}$ - 14	$\frac{43}{96}$	2	$2\frac{3}{16}$
$\frac{1}{2}$ - 11	$\frac{23}{32}$	$2\frac{1}{2}$	$2\frac{11}{16}$
$\frac{3}{4}$	$\frac{15}{16}$	3	$3\frac{5}{16}$
1	$1\frac{3}{16}$	$3\frac{1}{2}$	$3\frac{13}{16}$

Tap Drill Sizes for Taps of A. L. A. M. Standard

Size of Tap Inches	U. S. Threads per Inch	Size of Drill Inches	Size of Tap Inches	U. S. Threads per Inch	Size of Drill Inches
$\frac{1}{4}$	28	$\frac{7}{32}$	$\frac{5}{8}$	18	$\frac{35}{64}$
$\frac{5}{16}$	24	$\frac{11}{16}$	$\frac{11}{16}$	16	$\frac{59}{64}$
$\frac{3}{8}$	24	$\frac{61}{64}$	$\frac{3}{4}$	16	$\frac{64}{64}$
$\frac{7}{16}$	20	$\frac{64}{64}$	$\frac{3}{4}$	16	$\frac{64}{64}$
$\frac{1}{2}$	20	$\frac{3}{8}$	$\frac{7}{8}$	14	$\frac{25}{32}$
$\frac{9}{16}$	20	$\frac{7}{16}$	1	14	$\frac{37}{32}$
$\frac{1}{2}$	18	$\frac{1}{2}$			$\frac{39}{32}$



Decimal Equivalents of Regular Sizes

In.	Decimal	Wire	M.M.	In.	Decimal	Wire	M.M.	In.	Decimal	Wire	M.M.	
$\frac{1}{8}$.0135	80	.5	$\frac{5}{8}$.0748	48	1.9	$\frac{3}{32}$	1520	24	3.9	
	.0145	79			.0760				1535			
	.0156				.0781				1510	23		
	.0160	78			.0785				47	1562		
	.0180	77			.0787				2.	1570		22
	.0197				.0810				46	1575		4
	.0200	76			.0820				45	1590		21
	.0210	75			.0827				2.1	1610		20
	.0225	74			.0860				44	1614		4.1
	.0236				.0866				2.2	1654		4.2
	.0240	73			.0885				2.25	1660		19
	.0250	72			.0890				43	1673		4.25
.0260	71	.0905	2.3	1693	4.3							
.0276		.0935	42	1695	18							
.0280	70	.0937	$\frac{3}{32}$	1719	$\frac{1}{64}$							
.0292	69	.0945		2.4		1730	17					
.0296		.0960		41		1732	4.4					
.0310	68	.0980		40		1770	16					
$\frac{1}{32}$.0313		.0984		2.5		1771	4.5					
.0315		.0995		39		1800	15					
.0320	67	.1015		38		1811	4.6					
.0330	66	.1024		2.6		1820	14					
.0350	65	.1040		37		1850	13					
.0354		.1063		2.7		1871	4.7					
.0360	64	.1065		36		1875	4.75					
.0370	63	.1083		2.75		1890	12					
.0380	62	.1093	$\frac{7}{8}$	1910	11	4.8						
.0390	61	.1100		35	1929	4.9						
.0394		.1102		2.8	1935	10						
.0400	60	.1110		34	1960	9						
.0410	59	.1130		33	1968	5.						
.0420	58	.1142		2.9	1990	8						
.0430	57	.1160		32	1990	7						
.0433		.1181		3.	2010	5.1						
.0465	56	.1200		31	2031	7						
$\frac{3}{8}$.0469		.1220		3.1	2040	6						
.0472	1.2	.1250		$\frac{1}{8}$	2047	5.2						
.0492	1.25	.1260			3.2	2055	5					
.0512	1.3	.1279	3.25		2066	5.25						
.0520	55	.1285	30		2087	5.3						
.0550	54	.1299	3.3		2090	4						
.0551	1.4	.1339	3.4		2126	5.4						
.0591	1.5	.1360	29		2130	3						
.0595	53	.1378	3.5		2165	5.5						
$\frac{1}{16}$.0625		.1405	28		2187	$\frac{7}{32}$						
.0629	1.6	.1406	27		2205		5.6					
.0635	52	.1417	3.6		2210		2					
.0669	1.7	.1440	27		2244		5.7					
.0670	51	.1457	3.7	2264	5.75							
.0690		.1470	26	2280	1							
.0700	50	.1477	3.75	2283	5.8							
.0709	1.8	.1495	25	2323	5.9							
.0730	49	.1496	3.8									

Decimal Equivalents of Regular Sizes

In.	Decimal	Letter	M.M.	In.	Decimal	Letter	M.M.	In.	Decimal	M.M.
$\frac{1}{8}$	.2340	A			.3320	Q			.5625	
	.2344				.3346		8.5	$\frac{9}{16}$	.5709	14.5
	.2362		6.		.3386		8.6	$\frac{27}{64}$	.5781	
	.2380	B			.3390	R			.5906	15.
	.2401		6.1		.3425		8.7	$\frac{19}{32}$	.5937	
	.2420	C		$\frac{11}{32}$	.3437			$\frac{39}{64}$	.6094	
	.2441		6.2		.3446		8.75		.6102	15.5
	.2460		6.25		.3465		8.8	$\frac{5}{8}$	.6250	
	.2460	D			.3480	S			.6299	16.
	.2480		6.3		.3504		8.9	$\frac{41}{64}$	.6406	
$\frac{1}{4}$	.2500	E			.3543		9.		.6496	16.5
	.2520		6.4		.3580	T			.6562	
	.2559		6.5		.3583		9.1	$\frac{31}{32}$	.6693	17.
	.2570	F		$\frac{23}{64}$	.3594			$\frac{43}{64}$	.6719	
	.2598		6.6		.3622		9.2	$\frac{11}{16}$	.6875	
	.2610	G			.3641		9.25		.6890	17.5
	.2638		6.7		.3661		9.3	$\frac{45}{64}$	.7031	
	.2656				.3680	U			.7087	18.
	.2658		6.75		.3701		9.4	$\frac{31}{32}$	.7187	
	.2660	H			.3740		9.5		.7283	18.5
$\frac{3}{8}$	.2677		6.8	$\frac{3}{8}$	.3750			$\frac{47}{64}$	.7344	
	.2716		6.9		.3770	V			.7480	19.
	.2720	I			.3780		9.6	$\frac{3}{4}$	.7500	
	.2756		7.		.3819		9.7	$\frac{49}{64}$	.7656	
	.2770	J			.3839		9.75		.7677	19.5
	.2795		7.1		.3858		9.8	$\frac{35}{32}$	.7812	
	.2811	K			.3860	W			.7874	20.
	.2812				.3898		9.9	$\frac{51}{64}$	.7969	
	.2835		7.2	$\frac{25}{64}$	.3906				.8071	20.5
	.2854		7.25		.3937		10.	$\frac{1}{8}$	.8125	
$\frac{1}{2}$	.2874		7.3		.3970	X			.8268	21.
	.2900	L			.4040	Y			.8281	
	.2913			$\frac{13}{32}$	.4062			$\frac{53}{64}$	.8437	
	.2950	M			.4130	Z		$\frac{27}{32}$	.8465	21.5
	.2953		7.5		.4134		10.5	$\frac{25}{64}$	.8594	
	.2968				.4219				.8661	22.
	.2992		7.6	$\frac{27}{64}$	.4330		11.	$\frac{7}{8}$	.8750	
	.3020	N		$\frac{7}{16}$	.4375				.8858	22.5
	.3031		7.7		.4528		11.5	$\frac{23}{16}$	.8906	
	.3052		7.75	$\frac{29}{64}$	.4531				.9055	23.
$\frac{5}{8}$	.3071		7.8	$\frac{15}{32}$	.4687			$\frac{29}{32}$	.9062	
	.3110		7.9		.4724		12.	$\frac{31}{32}$	.9219	
	.3125			$\frac{31}{64}$	.4843			$\frac{31}{64}$	.9252	23.5
	.3150		8.		.4921		12.5	$\frac{1}{8}$	.9375	
	.3160	O		$\frac{1}{2}$	.5000				.9449	24.
	.3189		8.1		.5118		13.	$\frac{51}{64}$	.9531	
	.3228		8.2	$\frac{33}{64}$	.5156				.9646	24.5
	.3230	P		$\frac{33}{64}$	.5312			$\frac{33}{32}$	.9687	
	.3248		8.25		.5315		13.5		.9843	25.
	.3268		8.3	$\frac{35}{64}$	.5469			$\frac{53}{64}$	.9844	
.3281				.5512		14.	1	1 0000		
.3307		8.4								

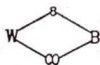


Decimal Equivalents of Regular Sizes

In.	Decimal	M.M.	In.	Decimal	M.M.	In.	Decimal	M.M.
	1 0040	25.5		1.4370	36.5	$1\frac{25}{64}$	1.8594	
$1\frac{1}{64}$	1.0156		$1\frac{1}{16}$	1.4375			1.8701	47.5
	1 0236	26.	$1\frac{3}{64}$	1.4531		$1\frac{1}{8}$	1.8750	
$1\frac{1}{32}$	1 0312			1.4567	37		1.8898	48.
	1 0433	26.5	$1\frac{1}{2}$	1.4687		$1\frac{3}{16}$	1.8906	
$1\frac{3}{64}$	1.0469			1.4764	37.5	$1\frac{5}{16}$	1.9062	
$1\frac{1}{16}$	1.0625		$1\frac{3}{4}$	1.4844			1.9095	48.5
	1.0630	27.		1.4961	38.	$1\frac{3}{8}$	1.9219	
$1\frac{5}{64}$	1.0781		$1\frac{1}{2}$	1.5000			1.9291	49.
	1.0827	27.5	$1\frac{3}{4}$	1.5156		$1\frac{1}{2}$	1.9375	
$1\frac{3}{16}$	1.0937			1.5158	38.5		1.9488	49.5
	1.1024	28.	$1\frac{1}{2}$	1.5312		$1\frac{3}{4}$	1.9531	
$1\frac{7}{64}$	1.1094			1.5354	39.		1.9685	50.
	1.1220	28.5	$1\frac{3}{4}$	1.5469		$1\frac{3}{8}$	1.9687	
$1\frac{1}{8}$	1.1250			1.5551	39.5	$1\frac{7}{16}$	1.9844	
$1\frac{9}{64}$	1.1406		$1\frac{9}{16}$	1.5625			1.9882	50.5
	1.1417	29.		1.5748	40.	2	2.0000	
$1\frac{5}{32}$	1.1562		$1\frac{7}{4}$	1.5781			2.0079	51.
	1.1614	29.5	$1\frac{1}{2}$	1.5937		$2\frac{1}{64}$	2.0156	
$1\frac{1}{4}$	1.1719			1.5945	40.5		2.0276	51.5
	1.1811	30.	$1\frac{3}{4}$	1.6094		$2\frac{1}{32}$	2.0312	
$1\frac{3}{16}$	1.1875			1.6142	41.	$2\frac{3}{64}$	2.0469	
	1.2008	30.5	$1\frac{5}{8}$	1.6250			2.0473	52.
$1\frac{1}{4}$	1.2031			1.6339	41.5	$2\frac{1}{16}$	2.0625	
$1\frac{5}{32}$	1.2187		$1\frac{1}{4}$	1.6406			2.0669	52.5
	1.2205	31.		1.6536	42.	$2\frac{5}{64}$	2.0781	
$1\frac{1}{4}$	1.2344		$1\frac{3}{2}$	1.6562			2.0867	53.
	1.2402	31.5	$1\frac{3}{4}$	1.6719		$2\frac{3}{32}$	2.0937	
$1\frac{1}{4}$	1.2500			1.6732	42.5		2.1063	53.5
	1.2599	32.	$1\frac{1}{16}$	1.6875		$2\frac{7}{64}$	2.1094	
$1\frac{1}{4}$	1.2656			1.6929	43.	$2\frac{1}{8}$	2.1250	
	1.2795	32.5	$1\frac{1}{8}$	1.7031			2.1260	54.
$1\frac{9}{32}$	1.2812			1.7126	43.5	$2\frac{3}{64}$	2.1406	
$1\frac{1}{4}$	1.2969		$1\frac{3}{8}$	1.7187			2.1457	54.5
	1.2992	33.		1.7323	44.	$2\frac{5}{32}$	2.1562	
$1\frac{5}{16}$	1.3125		$1\frac{1}{2}$	1.7344			2.1654	55.
	1.3189	33.5	$1\frac{3}{4}$	1.7500		$2\frac{1}{4}$	2.1719	
$1\frac{1}{4}$	1.3281			1.7520	44.5		2.1850	55.5
	1.3386	34.	$1\frac{1}{4}$	1.7656		$2\frac{3}{16}$	2.1875	
$1\frac{1}{2}$	1.3437			1.7717	45.	$2\frac{1}{4}$	2.2031	
	1.3583	34.5	$1\frac{3}{8}$	1.7812			2.2047	56.
$1\frac{1}{4}$	1.3594			1.7914	45.5	$2\frac{3}{32}$	2.2187	
$1\frac{3}{8}$	1.3750		$1\frac{1}{4}$	1.7969			2.2244	56.5
	1.3780	35.		1.8110	46.	$2\frac{1}{4}$	2.2344	
$1\frac{3}{4}$	1.3906		$1\frac{1}{2}$	1.8125			2.2441	57.
	1.3977	35.5	$1\frac{3}{4}$	1.8281		$2\frac{1}{4}$	2.2500	
$1\frac{1}{2}$	1.4062			1.8307	46.5		2.2638	57.5
	1.4173	36.	$1\frac{3}{2}$	1.8437		$2\frac{1}{2}$	2.2656	
$1\frac{1}{4}$	1.4219			1.8504	47.	$2\frac{3}{8}$	2.2812	

Decimal Equivalents of Regular Sizes

Ins.	Decimal	M.M.	Ins.	Decimal	M.M.	Ins.	Decimal
$2\frac{13}{64}$	2.2835	58.	$2\frac{23}{64}$	2.7165	69	$3\frac{1}{4}$	3.2500
$2\frac{5}{16}$	2.2969		$2\frac{27}{64}$	2.7187		$3\frac{1}{8}$	3.2656
	2.3031	58.5		2.7344		$3\frac{3}{32}$	3.2812
	2.3125			2.7362	69.5	$3\frac{19}{64}$	3.2969
	2.3228	59.	$2\frac{3}{4}$	2.7500		$3\frac{1}{16}$	3.3125
$2\frac{21}{64}$	2.3281			2.7559	70.	$3\frac{21}{64}$	3.3281
	2.3425	59.5	$2\frac{49}{64}$	2.7656		$3\frac{11}{32}$	3.3437
$2\frac{11}{32}$	2.3437			2.7756	70.5	$3\frac{5}{16}$	3.3594
$2\frac{33}{64}$	2.3594		$2\frac{35}{32}$	2.7812		$3\frac{3}{8}$	3.3750
	2.3622	60.		2.7953	71.	$3\frac{25}{64}$	3.3906
$2\frac{3}{8}$	2.3750		$2\frac{21}{16}$	2.7969		$3\frac{13}{32}$	3.4062
	2.3819	60.5	$2\frac{13}{16}$	2.8125		$3\frac{17}{64}$	3.4219
$2\frac{25}{64}$	2.3906			2.8150	71.5	$3\frac{7}{16}$	3.4375
	2.4016	61.	$2\frac{31}{64}$	2.8281		$3\frac{23}{64}$	3.4531
$2\frac{13}{32}$	2.4062			2.8346	72.	$3\frac{15}{16}$	3.4687
	2.4213	61.5	$2\frac{37}{32}$	2.8437		$3\frac{11}{32}$	3.4844
$2\frac{27}{64}$	2.4219			2.8543	72.5	$3\frac{1}{2}$	3.5000
$2\frac{7}{16}$	2.4375		$2\frac{35}{64}$	2.8594		$3\frac{13}{32}$	3.5156
	2.4409	62.		2.8740	73.	$3\frac{17}{64}$	3.5312
$2\frac{29}{64}$	2.4531		$2\frac{7}{8}$	2.8750		$3\frac{21}{64}$	3.5469
	2.4606	62.5	$2\frac{57}{64}$	2.8906		$3\frac{9}{16}$	3.5625
$2\frac{15}{32}$	2.4687			2.8937	73.5	$3\frac{25}{64}$	3.5781
	2.4803	63.	$2\frac{39}{32}$	2.9062		$3\frac{29}{64}$	3.5937
$2\frac{21}{64}$	2.4844			2.9134	74.	$3\frac{23}{32}$	3.6093
$2\frac{1}{2}$	2.5000	63.5	$2\frac{39}{64}$	2.9219		$3\frac{27}{64}$	3.6250
$2\frac{33}{64}$	2.5156			2.9331	74.5	$3\frac{11}{16}$	3.6406
	2.5197	64.	$2\frac{15}{16}$	2.9375		$3\frac{21}{32}$	3.6562
$2\frac{17}{32}$	2.5312			2.9527	75.	$3\frac{25}{64}$	3.6719
	2.5394	64.5	$2\frac{21}{64}$	2.9531		$3\frac{11}{16}$	3.6875
$2\frac{35}{64}$	2.5469		$2\frac{31}{32}$	2.9687		$3\frac{25}{64}$	3.7031
	2.5590	65.		2.9724	75.5	$3\frac{23}{32}$	3.7187
$2\frac{9}{16}$	2.5625		$2\frac{31}{64}$	2.9844		$3\frac{17}{16}$	3.7344
$2\frac{27}{64}$	2.5781			2.9921	76	$3\frac{3}{4}$	3.7500
	2.5787	65.5	3	3.0000		$3\frac{22}{64}$	3.7656
$2\frac{19}{32}$	2.5937		$3\frac{1}{4}$	3.0156		$3\frac{26}{64}$	3.7812
	2.5984	66.	$3\frac{5}{32}$	3.0312		$3\frac{31}{64}$	3.7969
$2\frac{25}{64}$	2.6093		$3\frac{9}{64}$	3.0469		$3\frac{13}{16}$	3.8125
	2.6181	66.5	$3\frac{1}{16}$	3.0625		$3\frac{27}{64}$	3.8281
$2\frac{5}{8}$	2.6250		$3\frac{5}{32}$	3.0781		$3\frac{23}{32}$	3.8437
	2.6378	67.	$3\frac{3}{16}$	3.0937		$3\frac{25}{64}$	3.8594
$2\frac{41}{64}$	2.6406		$3\frac{7}{32}$	3.1094		$3\frac{7}{8}$	3.8750
$2\frac{37}{64}$	2.6562		$3\frac{11}{64}$	3.1250		$3\frac{3}{4}$	3.8906
	2.6575	67.5	$3\frac{1}{8}$	3.1406		$3\frac{29}{64}$	3.9062
$2\frac{43}{64}$	2.6719		$3\frac{3}{16}$	3.1562		$3\frac{33}{64}$	3.9219
	2.6772	68.	$3\frac{11}{32}$	3.1719		$3\frac{15}{16}$	3.9375
$2\frac{11}{16}$	2.6875		$3\frac{1}{16}$	3.1875		$3\frac{31}{64}$	3.9531
	2.6968	68.5	$3\frac{13}{64}$	3.2031		$3\frac{21}{32}$	3.9687
$2\frac{45}{64}$	2.7031		$3\frac{1}{12}$	3.2187		$3\frac{25}{64}$	3.9844
			$3\frac{15}{64}$	3.2344		4	4.0000



Values of Fractional Sizes Expressed in Millimeters

Fractional Sizes		1 In.	2 Ins.	3 Ins.	4 Ins.	5 Ins.	6 Ins.
		25.4	50.8	76.2	101.6	127.	152.4
$\frac{1}{64}$	0.40	25.80	51.20	76.60	102	127.39	152.79
$\frac{1}{32}$	0.79	26.19	51.59	76.99	102.39	127.79	153.19
$\frac{3}{64}$	1.19	26.59	51.99	77.39	102.79	128.19	153.59
$\frac{1}{16}$	1.59	26.99	52.39	77.79	103.19	128.59	153.98
$\frac{5}{64}$	1.98	27.38	52.78	78.18	103.58	128.98	154.38
$\frac{3}{32}$	2.38	27.78	53.18	78.58	103.98	129.38	154.78
$\frac{7}{64}$	2.77	28.17	53.58	78.98	104.37	129.78	155.18
$\frac{1}{8}$	3.17	28.57	53.97	79.37	104.77	130.17	155.57
$\frac{9}{64}$	3.57	28.97	54.37	79.77	105.17	130.57	155.97
$\frac{5}{32}$	3.97	29.37	54.77	80.17	105.57	130.97	156.37
$\frac{11}{64}$	4.37	29.76	55.16	80.56	105.96	131.36	156.76
$\frac{3}{16}$	4.76	30.16	55.56	80.96	106.36	131.76	157.16
$\frac{13}{64}$	5.16	30.56	55.96	81.36	106.76	132.16	157.56
$\frac{7}{32}$	5.56	30.96	56.36	81.75	107.16	132.55	157.95
$\frac{15}{64}$	5.95	31.35	56.75	82.15	107.55	132.95	158.35
$\frac{1}{4}$	6.35	31.75	57.15	82.55	107.95	133.35	158.75
$\frac{17}{64}$	6.75	32.15	57.55	82.95	108.34	133.74	159.14
$\frac{9}{32}$	7.14	32.54	57.94	83.34	108.74	134.14	159.54
$\frac{19}{64}$	7.54	32.94	58.34	83.74	109.14	134.54	159.94
$\frac{5}{16}$	7.94	33.34	58.74	84.14	109.54	134.94	160.33
$\frac{21}{64}$	8.33	33.73	59.13	84.53	109.93	135.33	160.73
$\frac{11}{32}$	8.73	34.13	59.53	84.93	110.33	135.73	161.13
$\frac{23}{64}$	9.13	34.53	59.93	85.33	110.73	136.13	161.53
$\frac{3}{8}$	9.52	34.92	60.32	85.72	111.12	136.52	161.92
$\frac{25}{64}$	9.92	35.32	60.72	86.12	111.52	136.92	162.32
$\frac{13}{32}$	10.32	35.72	61.12	86.52	111.92	137.32	162.72
$\frac{27}{64}$	10.72	36.11	61.51	86.91	112.31	137.71	163.11
$\frac{7}{16}$	11.11	36.51	61.91	87.31	112.71	138.11	163.51
$\frac{29}{64}$	11.51	36.91	62.31	87.71	113.11	138.51	163.91
$\frac{15}{32}$	11.91	37.31	62.71	88.1	113.5	138.9	164.3
$\frac{31}{64}$	12.3	37.7	63.1	88.5	113.9	139.3	164.7
$\frac{1}{2}$	12.7	38.1	63.5	88.9	114.3	139.7	165.1

1 Millimeter = .03937 inch.

Continued on next page

Values of Fractional Sizes Expressed in Millimeters

(CONTINUED)

Fractional Sizes		1 In.	2 In.	3 In.	4 In.	5 In.	6 In.
$\frac{33}{64}$	13.10	38.49	63.90	89.3	114.69	140.09	165.49
$\frac{17}{32}$	13.49	38.89	64.29	89.69	115.09	140.49	165.89
$\frac{35}{64}$	13.89	39.29	64.69	90.09	115.49	140.89	166.29
$\frac{9}{16}$	14.29	39.69	65.09	90.49	115.89	141.29	166.68
$\frac{37}{64}$	14.68	40.08	65.48	90.88	116.28	141.68	167.08
$\frac{19}{32}$	15.08	40.48	65.88	91.28	116.68	142.08	167.48
$\frac{39}{64}$	15.48	40.88	66.28	91.68	117.08	142.48	167.88
$\frac{5}{8}$	15.87	41.27	66.67	92.07	117.47	142.87	168.27
$\frac{41}{64}$	16.27	41.67	67.07	92.47	117.87	143.27	168.67
$\frac{21}{32}$	16.67	42.07	67.47	92.87	118.27	143.67	169.07
$\frac{43}{64}$	17.07	42.46	67.86	93.26	118.66	144.06	169.46
$\frac{11}{16}$	17.46	42.86	68.26	93.66	119.06	144.46	169.86
$\frac{45}{64}$	17.86	43.26	68.66	94.06	119.46	144.86	170.26
$\frac{23}{32}$	18.26	43.66	69.05	94.45	119.85	145.25	170.65
$\frac{47}{64}$	18.65	44.05	69.45	94.85	120.25	145.65	171.05
$\frac{3}{4}$	19.05	44.45	69.85	95.25	120.65	146.05	171.45
$\frac{49}{64}$	19.45	44.85	70.25	95.65	121.04	146.44	171.84
$\frac{25}{32}$	19.84	45.24	70.64	96.04	121.44	146.84	172.24
$\frac{51}{64}$	20.24	45.64	71.04	96.44	121.84	147.24	172.64
$\frac{13}{16}$	20.64	46.04	71.44	96.84	122.24	147.63	173.03
$\frac{53}{64}$	21.03	46.43	71.83	97.23	122.63	148.03	173.43
$\frac{27}{32}$	21.43	46.83	72.23	97.63	123.03	148.43	173.83
$\frac{55}{64}$	21.83	47.23	72.63	98.03	123.43	148.83	174.22
$\frac{7}{8}$	22.22	47.62	73.02	98.42	123.82	149.22	174.62
$\frac{57}{64}$	22.62	48.02	73.42	98.82	124.22	149.62	175.02
$\frac{29}{32}$	23.02	48.42	73.82	99.22	124.62	150.02	175.42
$\frac{59}{64}$	23.42	48.81	74.21	99.61	125.01	150.41	175.81
$\frac{15}{16}$	23.81	49.21	74.61	100.01	125.41	150.81	176.21
$\frac{61}{64}$	24.21	49.61	75.01	100.41	125.81	151.21	176.61
$\frac{31}{32}$	24.61	50.01	75.4	100.8	126.2	151.6	177.
$\frac{63}{64}$	25	50.4	75.8	101.2	126.6	152	177.4

1 Millimeter = .03937 inch.



Speed and Feed of Carbon Drills

The following tables of Speeds and Feeds are based upon average Shop Working Conditions. By following them, tool troubles will be reduced to a minimum.

Many of our customers are greatly exceeding these rules and are securing more capacity from the use of our CARBON AND HIGH SPEED DRILLS than shown in the tables. This, however, is due to their own local conditions.

CAST IRON AND MILD STEEL				TOOL STEEL			
Size	R. P. M.	Feed Per Rev.	Feed Per Min	Size	R. P. M.	Feed Per Rev.	Feed Per Min
$\frac{1}{16}$	2445	.002	$4\frac{57}{64}$	$\frac{1}{16}$	1841	.001	$1\frac{27}{32}$
$\frac{1}{8}$	1800	.003	$5\frac{1}{2}$	$\frac{1}{8}$	1200	.002	$2\frac{7}{16}$
$\frac{3}{16}$	1290	.0037	$4\frac{7}{8}$	$\frac{3}{16}$	783	.0036	$2\frac{13}{16}$
$\frac{1}{4}$	700	.005	$3\frac{1}{2}$	$\frac{1}{4}$	600	.003	2
$\frac{5}{16}$	550	.005	$2\frac{3}{4}$	$\frac{5}{16}$	430	.004	$1\frac{3}{4}$
$\frac{3}{8}$	358	.005	$1\frac{51}{64}$	$\frac{3}{8}$	254	.004	$1\frac{1}{32}$
$\frac{7}{16}$	300	.006	$1\frac{11}{64}$	$\frac{7}{16}$	225	.004	$1\frac{29}{32}$
$\frac{1}{2}$	270	.006	$1\frac{5}{8}$	$\frac{1}{2}$	199	.004	$1\frac{51}{64}$
$\frac{9}{16}$	230	.007	$1\frac{39}{64}$	$\frac{9}{16}$	188	.004	$1\frac{64}{64}$
$\frac{5}{8}$	216	.007	$1\frac{33}{64}$	$\frac{5}{8}$	150	.005	$1\frac{3}{4}$
$\frac{11}{16}$	190	.008	$1\frac{33}{64}$	$\frac{11}{16}$	142	.005	$1\frac{4}{32}$
$\frac{3}{4}$	185	.008	$1\frac{31}{64}$	$\frac{3}{4}$	120	.006	$1\frac{23}{32}$
$\frac{13}{16}$	166	.009	$1\frac{31}{64}$	$\frac{13}{16}$	118	.006	$1\frac{32}{32}$
$\frac{7}{8}$	149	.010	$1\frac{31}{64}$	$\frac{7}{8}$	100	.007	$1\frac{35}{64}$
$\frac{15}{16}$	142	.010	$1\frac{27}{16}$	$\frac{15}{16}$	98	.007	$1\frac{45}{64}$
1	134	.010	$1\frac{11}{32}$	1	96	.007	$1\frac{64}{64}$
$1\frac{1}{16}$	128	.010	$1\frac{9}{32}$	$1\frac{1}{16}$	94	.007	$1\frac{43}{64}$
$1\frac{1}{8}$	115	.011	$1\frac{17}{64}$	$1\frac{1}{8}$	82	.008	$1\frac{64}{64}$
$1\frac{1}{4}$	113	.011	$1\frac{15}{64}$	$1\frac{1}{4}$	81	.008	$1\frac{32}{32}$
$1\frac{1}{2}$	107	.011	$1\frac{11}{64}$	$1\frac{1}{2}$	78	.008	$1\frac{21}{32}$
$1\frac{3}{8}$	102	.011	$1\frac{11}{8}$	$1\frac{3}{8}$	70	.009	$1\frac{32}{64}$
$1\frac{1}{2}$	93	.012	$1\frac{7}{64}$	$1\frac{1}{2}$	69	.009	$1\frac{5}{8}$
$1\frac{5}{8}$	92	.012	$1\frac{7}{64}$	$1\frac{5}{8}$	66	.009	$1\frac{5}{8}$
$1\frac{1}{2}$	90	.012	$1\frac{5}{64}$	$1\frac{1}{2}$	66	.009	$1\frac{32}{32}$
$1\frac{9}{16}$	82	.013	$1\frac{1}{16}$	$1\frac{9}{16}$	64	.009	$1\frac{37}{64}$
$1\frac{5}{8}$	82	.013	$1\frac{1}{16}$	$1\frac{5}{8}$	62	.009	$1\frac{9}{16}$
$1\frac{11}{16}$	79	.013	$1\frac{1}{32}$	$1\frac{11}{16}$	60	.009	$1\frac{35}{64}$
$1\frac{3}{4}$	78	.013	$1\frac{1}{64}$	$1\frac{3}{4}$	55	.010	$1\frac{35}{64}$
$1\frac{7}{8}$	76	.013	$1\frac{23}{64}$	$1\frac{7}{8}$	55	.010	$1\frac{64}{64}$
$1\frac{1}{2}$	76	.013	$1\frac{63}{64}$	$1\frac{1}{2}$	53	.010	$1\frac{32}{32}$
$1\frac{7}{8}$	70	.014	$1\frac{63}{64}$	$1\frac{7}{8}$	51	.010	$1\frac{33}{64}$
$1\frac{15}{16}$	69	.014	$1\frac{31}{32}$	$1\frac{15}{16}$	50	.010	$1\frac{64}{64}$
2	66	.014	$1\frac{59}{64}$	2	49	.010	$1\frac{1}{2}$
$2\frac{1}{16}$	65	.014	$1\frac{59}{64}$	$2\frac{1}{16}$	47	.010	$1\frac{31}{64}$
$2\frac{1}{8}$	63	.014	$1\frac{59}{64}$	$2\frac{1}{8}$	47	.010	$1\frac{15}{32}$
$2\frac{3}{16}$	61	.014	$1\frac{7}{8}$	$2\frac{3}{16}$	43	.011	$1\frac{32}{32}$
$2\frac{1}{4}$	59	.014	$1\frac{55}{64}$	$2\frac{1}{4}$	42	.011	$1\frac{32}{32}$
$2\frac{3}{8}$	56	.014	$1\frac{53}{64}$	$2\frac{3}{8}$	41	.011	$1\frac{29}{32}$
$2\frac{1}{2}$	55	.014	$1\frac{53}{64}$	$2\frac{1}{2}$	40	.011	$1\frac{29}{32}$
$2\frac{5}{8}$	49	.015	$1\frac{49}{64}$	$2\frac{5}{8}$	38	.011	$1\frac{64}{64}$
$2\frac{3}{4}$	48	.015	$1\frac{47}{64}$	$2\frac{3}{4}$	36	.011	$1\frac{15}{16}$
$2\frac{7}{8}$	46	.015	$1\frac{23}{32}$	$2\frac{7}{8}$	34	.011	$1\frac{13}{32}$
3	44	.015	$1\frac{11}{16}$	3	33	.011	$1\frac{25}{64}$
			$1\frac{21}{32}$				$1\frac{64}{64}$
			$1\frac{32}{32}$				$1\frac{23}{64}$

For Brass 75% faster

Speed and Feed for "Diamond" and "Hercules" High Speed Twist Drills

CAST IRON AND MILD STEEL				TOOL STEEL			
Size	R. P. M.	Feed per Revolution	Feed Per Minute	Size	R. P. M.	Feed Per Revolution	Feed Per Minute
$\frac{1}{16}$	5519	.002	11	$\frac{1}{16}$	3057	.001	3
$\frac{1}{8}$	3000	.003	9	$\frac{1}{8}$	2500	.002	5
$\frac{3}{16}$	2100	.0035	$7\frac{7}{16}$	$\frac{3}{16}$	1300	.0037	$4\frac{7}{8}$
$\frac{1}{4}$	1400	.005	7	$\frac{1}{4}$	900	.004	$3\frac{5}{8}$
$\frac{5}{16}$	1167	.006	7	$\frac{5}{16}$	700	.005	$3\frac{1}{2}$
$\frac{3}{8}$	873	.007	$6\frac{7}{64}$	$\frac{3}{8}$	509	.006	$3\frac{3}{64}$
$\frac{7}{16}$	751	.008	6	$\frac{7}{16}$	417	.007	$2\frac{29}{32}$
$\frac{1}{2}$	639	.009	$5\frac{3}{4}$	$\frac{1}{2}$	382	.007	$2\frac{6}{4}$
$\frac{9}{16}$	559	.010	$5\frac{19}{32}$	$\frac{9}{16}$	349	.007	$2\frac{29}{64}$
$\frac{5}{8}$	491	.011	$5\frac{3}{2}$	$\frac{5}{8}$	316	.007	$2\frac{3}{32}$
$\frac{11}{16}$	442	.012	$5\frac{19}{64}$	$\frac{11}{16}$	274	.008	$2\frac{3}{16}$
$\frac{3}{4}$	398	.013	$5\frac{1}{4}$	$\frac{3}{4}$	268	.008	$2\frac{3}{32}$
$\frac{13}{16}$	363	.014	$5\frac{7}{64}$	$\frac{13}{16}$	237	.009	$2\frac{1}{8}$
$\frac{7}{8}$	335	.015	$5\frac{3}{2}$	$\frac{7}{8}$	225	.009	$2\frac{3}{32}$
$\frac{15}{16}$	312	.016	$4\frac{63}{64}$	$\frac{15}{16}$	200	.010	2
1	287	.017	$4\frac{7}{8}$	1	196	.010	$1\frac{31}{32}$
$1\frac{1}{16}$	270	.018	$4\frac{55}{64}$	$1\frac{1}{16}$	193	.010	$1\frac{16}{16}$
$1\frac{1}{8}$	255	.019	$4\frac{23}{32}$	$1\frac{1}{8}$	173	.011	$1\frac{29}{32}$
$1\frac{3}{16}$	241	.020	$4\frac{53}{64}$	$1\frac{3}{16}$	169	.011	$1\frac{7}{8}$
$1\frac{1}{4}$	232	.020	$4\frac{1}{4}$	$1\frac{1}{4}$	153	.012	$1\frac{3}{4}$
$1\frac{5}{16}$	224	.020	$4\frac{31}{64}$	$1\frac{5}{16}$	146	.012	$1\frac{3}{4}$
$1\frac{3}{8}$	215	.020	$4\frac{19}{64}$	$1\frac{3}{8}$	140	.012	$1\frac{11}{16}$
$1\frac{7}{16}$	210	.020	$4\frac{13}{64}$	$1\frac{7}{16}$	133	.012	$1\frac{19}{32}$
$1\frac{1}{2}$	195	.020	$3\frac{29}{32}$	$1\frac{1}{2}$	127	.012	$1\frac{6}{4}$
$1\frac{9}{16}$	185	.020	$3\frac{45}{64}$	$1\frac{9}{16}$	122	.012	$1\frac{15}{32}$
$1\frac{5}{8}$	176	.020	$3\frac{33}{64}$	$1\frac{5}{8}$	117	.012	$1\frac{13}{32}$
$1\frac{11}{16}$	170	.020	$3\frac{13}{32}$	$1\frac{11}{16}$	113	.012	$1\frac{23}{64}$
$1\frac{3}{4}$	164	.020	$3\frac{9}{32}$	$1\frac{3}{4}$	109	.012	$1\frac{19}{32}$
$1\frac{13}{16}$	158	.020	$3\frac{5}{32}$	$1\frac{13}{16}$	105	.012	$1\frac{17}{64}$
$1\frac{7}{8}$	153	.020	$3\frac{1}{16}$	$1\frac{7}{8}$	103	.012	$1\frac{15}{64}$
$1\frac{15}{16}$	148	.020	$2\frac{31}{32}$	$1\frac{15}{16}$	99	.012	$1\frac{6}{4}$
2	143	.020	$2\frac{55}{64}$	2	96	.012	$1\frac{5}{32}$
$2\frac{1}{16}$	139	.020	$2\frac{35}{32}$	$2\frac{1}{16}$	92	.012	$1\frac{6}{4}$
$2\frac{1}{8}$	135	.020	$2\frac{45}{64}$	$2\frac{1}{8}$	90	.012	$1\frac{5}{64}$
$2\frac{3}{16}$	131	.020	$2\frac{9}{8}$	$2\frac{3}{16}$	87	.012	$1\frac{6}{4}$
$2\frac{1}{4}$	128	.020	$2\frac{9}{16}$	$2\frac{1}{4}$	85	.012	$1\frac{1}{64}$
$2\frac{3}{8}$	121	.020	$2\frac{7}{64}$	$2\frac{3}{8}$	80	.012	$1\frac{3}{32}$
$2\frac{1}{2}$	114	.020	$2\frac{9}{32}$	$2\frac{1}{2}$	77	.012	$1\frac{59}{64}$
$2\frac{5}{8}$	109	.020	$2\frac{11}{64}$	$2\frac{5}{8}$	73	.012	$1\frac{7}{8}$
$2\frac{3}{4}$	104	.020	$2\frac{5}{64}$	$2\frac{3}{4}$	69	.012	$1\frac{53}{64}$
$2\frac{7}{8}$	100	.020	2	$2\frac{7}{8}$	66	.012	$1\frac{64}{64}$
3	96	.020	$1\frac{59}{64}$	3	64	.012	$1\frac{49}{64}$

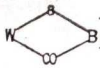


Table of Cutting Speeds

FEET PER MINUTE

Diam- eter Ins.	30	35	40	45	50	55	60	65	70	75	80
	REVOLUTIONS PER MINUTE										
$\frac{1}{16}$	1834	2140	2445	2751	3057	3363	3668	3974	4280	4586	4891
$\frac{1}{8}$	917	1070	1222	1375	1528	1681	1834	1986	2139	2292	2445
$\frac{3}{16}$	611	713	815	917	1019	1121	1222	1325	1426	1529	1630
$\frac{1}{4}$	458	535	611	688	764	851	917	994	1070	1147	1222
$\frac{5}{16}$	367	428	489	550	611	672	733	794	856	917	978
$\frac{3}{8}$	306	357	408	458	509	560	611	662	713	764	815
$\frac{7}{16}$	262	306	349	393	437	481	524	568	611	656	699
$\frac{1}{2}$	229	268	306	344	382	420	459	497	535	573	611
$\frac{9}{16}$	204	238	272	306	340	373	407	441	475	509	543
$\frac{5}{8}$	184	214	245	276	306	337	367	398	428	459	489
$\frac{11}{16}$	167	194	222	249	273	300	333	360	389	416	444
$\frac{3}{4}$	153	178	203	229	254	279	306	33	357	381	408
$\frac{13}{16}$	142	166	190	213	237	261	284	308	332	356	379
$\frac{7}{8}$	131	153	175	196	219	241	262	285	306	329	349
$\frac{15}{16}$	122	142	163	183	204	224	244	265	285	305	326
1	115	134	153	172	191	210	229	258	267	287	306
$1\frac{1}{16}$	108	126	144	162	180	197	215	233	251	269	287
$1\frac{1}{8}$	102	119	136	153	170	187	204	221	238	255	272
$1\frac{3}{16}$	96.6	113	129	145	161	177	193	209	225	242	258
$1\frac{1}{4}$	91.8	107	123	137	153	168	183	199	214	230	245
$1\frac{5}{16}$	87.3	102	116	131	146	160	175	189	204	218	233
$1\frac{3}{8}$	83.3	97.2	111	125	139	153	167	180	195	208	222
$1\frac{7}{16}$	79.5	92.8	106	119	133	146	159	172	186	199	212
$1\frac{1}{2}$	76.3	89.2	102	115	127	140	153	165	178	191	204
$1\frac{9}{16}$	73.2	85.4	97.6	110	122	134	146	159	171	183	195
$1\frac{5}{8}$	70.5	82.2	93.9	106	117	129	141	152	165	176	188
$1\frac{3}{4}$	67.8	79.1	90.4	102	113	124	136	147	158	170	181
$1\frac{7}{8}$	65.5	76.4	87.3	98.2	109	120	131	142	153	164	175
$1\frac{15}{16}$	63.3	73.9	84.4	95.0	106	116	127	137	148	158	169
$1\frac{1}{8}$	61.1	71.3	81.5	91.9	102	112	122	133	143	153	163
$1\frac{1}{4}$	59.1	69.0	78.8	88.7	98.5	108	118	128	138	148	158
2	57.3	66.9	76.4	86.0	95.5	105	115	124	134	143	153
$2\frac{1}{8}$	54.0	63.0	72.0	81.0	90.0	99.0	108	117	126	135	144
$2\frac{1}{4}$	51.0	59.4	68.0	76.2	85.5	93.5	102	111	119	128	136
$2\frac{3}{8}$	48.3	56.4	64.4	72.5	80.5	88.6	96.6	105	113	121	129
$2\frac{1}{2}$	45.8	53.5	61.2	68.8	76.3	84.2	91.7	99.5	107	114	122
$2\frac{5}{8}$	43.5	50.8	58.0	65.3	72.5	79.8	87.0	94.3	102	109	116
$2\frac{3}{4}$	41.7	48.6	55.6	62.5	69.5	76.5	83.4	90.4	97.2	104	111
$2\frac{7}{8}$	39.6	46.2	52.8	59.4	66.0	72.6	79.2	85.8	92.4	99.0	106
3	38.2	44.6	51.0	57.3	63.7	69.9	76.4	82.6	89.1	95.3	102
$3\frac{1}{4}$	35.1	41.0	46.8	52.7	58.5	64.4	70.2	76.1	81.9	87.8	93.6
$3\frac{1}{2}$	32.7	38.2	43.6	49.1	54.5	60.0	65.5	70.8	76.4	81.8	87.4
$3\frac{3}{4}$	30.6	35.7	40.8	45.9	51.0	56.1	61.2	66.3	71.4	76.5	81.6
4	28.7	33.4	38.2	43.0	47.8	52.6	57.3	61.2	66.9	71.7	76.4

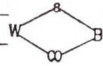


Table of Cutting Speeds—Continued

FEET PER MINUTE

Diam- eter Ins.	90	100	110	120	125	130	140	150	160	170	175
	REVOLUTIONS PER MINUTE										
$\frac{1}{16}$	5502	6114	6725	7337	7643	7948	8560	9171	9782	.....	.....
$\frac{1}{8}$	2750	3056	3362	3667	3820	3973	4278	4584	4890	5195	5348
$\frac{1}{4}$	1834	2038	2242	2446	2548	2649	2853	3057	3261	3465	5367
$\frac{3}{8}$	1376	1528	1681	1734	1910	1986	2139	2292	2445	2598	2674
$\frac{1}{2}$	1100	1222	1344	1466	1527	1589	1711	1833	1955	2077	2139
$\frac{5}{8}$	916	1018	1121	1222	1273	1323	1425	1527	1629	1731	1782
$\frac{3}{4}$	786	874	961	1049	1093	1136	1224	1311	1398	1486	1530
$\frac{7}{8}$	688	764	840	917	955	993	1070	1146	1222	1299	1337
1	611	679	747	813	869	883	951	1019	1086	1154	1188
$1\frac{1}{8}$	552	612	673	736	765	796	857	918	979	1040	1071
$1\frac{1}{4}$	500	555	611	666	692	722	770	833	888	944	971
$1\frac{3}{8}$	458	508	559	610	635	661	711	762	813	864	889
$1\frac{1}{2}$	427	474	521	569	593	616	664	711	758	806	830
$1\frac{5}{8}$	392	438	482	526	548	569	613	657	701	745	767
$1\frac{3}{4}$	366	407	448	488	509	529	570	611	651	692	712
$1\frac{7}{8}$	344	382	420	458	478	497	535	573	611	649	669
2	323	359	395	431	449	467	503	539	579	610	628
$2\frac{1}{8}$	306	340	374	408	425	442	476	510	544	578	595
$2\frac{1}{4}$	290	322	354	386	403	419	451	483	515	547	564
$2\frac{3}{8}$	274	306	337	367	383	398	428	459	490	520	536
$2\frac{1}{2}$	262	291	320	349	351	378	407	437	466	495	509
$2\frac{5}{8}$	250	278	306	334	348	361	389	417	445	472	487
$2\frac{3}{4}$	239	265	292	318	331	345	371	398	424	451	464
$2\frac{7}{8}$	230	254	279	305	318	330	356	381	406	432	445
3	220	244	268	293	305	317	342	366	390	415	427
$3\frac{1}{8}$	212	234	257	281	293	304	328	351	374	398	410
$3\frac{1}{4}$	203	226	249	271	283	294	316	339	362	384	396
$3\frac{3}{8}$	196	218	240	262	273	283	305	327	349	371	382
$3\frac{1}{2}$	190	211	232	253	264	274	295	317	338	359	369
$3\frac{5}{8}$	184	204	224	244	255	265	286	306	326	347	357
$3\frac{3}{4}$	177	197	217	236	246	256	276	296	315	335	345
4	172	191	210	229	239	248	267	287	306	325	334
$4\frac{1}{8}$	162	180	198	216	225	234	252	270	288	306	315
$4\frac{1}{4}$	153	170	187	204	213	221	238	255	272	289	298
$4\frac{3}{8}$	145	161	177	193	201	209	225	242	258	274	282
$4\frac{1}{2}$	138	153	168	184	191	199	213	230	245	260	268
$4\frac{5}{8}$	131	145	160	174	181	189	203	218	232	247	254
$4\frac{3}{4}$	125	139	153	167	174	181	195	209	222	236	242
$4\frac{7}{8}$	119	132	145	158	165	172	185	198	211	224	231
5	114	127	140	152	159	165	178	191	203	216	222
$5\frac{1}{8}$	105	117	129	140	146	152	164	176	188	199	205
$5\frac{1}{4}$	98.1	109	120	131	136	142	153	164	174	186	191
$5\frac{3}{8}$	91.8	102	112	122	128	133	143	153	163	175	179
$5\frac{1}{2}$	86.0	95.6	105	115	120	124	134	143	153	163	167

DRILL GRINDING

TO secure the greatest efficiency and longest life of a drill, it is absolutely necessary that it be properly ground at the point. The cutting edges must be straight and of exactly the same length, as well as forming a proper and uniform angle with the axis of the drill, which is 59° for general use. (Fig. A.)

The importance of lip clearance or backing off of the cutting edges should not be overlooked. 12° at the periphery (Fig. B.) is the best angle for ordinary shop work. This angle should be uniformly increased toward the center of the drill, so that the line across the center shows an angle of about 125° to the cutting edges. (Fig. C.)

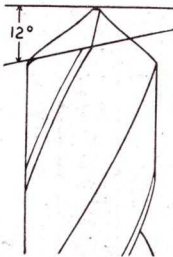


Fig. B
General Shop Use

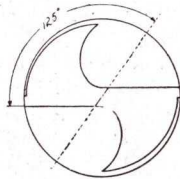


Fig. C

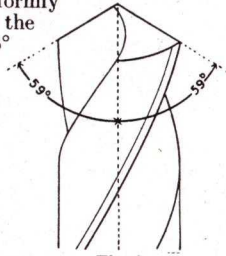


Fig. A
General Shop Use

To add strength to the drill, the thickness of the center web is increased toward the shank; therefore, as the drill becomes shorter through use, to cut free its center should be thinned to about $\frac{1}{8}$ of the total diameter of the drill on sizes up to $1\frac{1}{2}$ in. in diameter. Larger sizes, center web should be thinned to about one-twelfth of the total diameter of the drill. Great care should be taken to not injure the cutting edge and the operator should be careful to remove an equal amount of stock from each groove, so as to keep the point central.

Experience has shown better results are frequently obtained by varying the angle of the point and lip clearance to suit nature of material to be drilled. In soft material where a heavier feed is used the angle of lip clearance may be increased to 15° at the periphery, with a like increase in the angle toward the center.

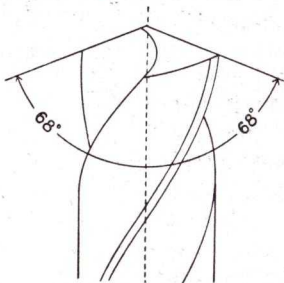


Fig. D. For Hard Material

More drills have been split up the center by insufficient angle of lip clearance near the center web than in any other way.

In drilling extremely hard material, where lighter feed is used, would suggest grinding the point to an angle of 68° (Fig. D), and the angle of lip clearance decreased to 9° at the

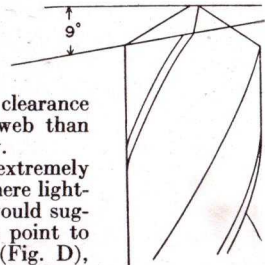


Fig. E
For Hard Material

periphery (Fig. E). As a guard against drill troubles, the grinding of the points should be frequently examined.

PERFECT DRILL POINT

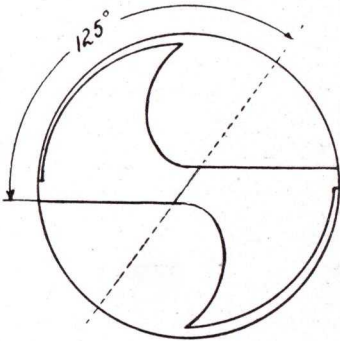
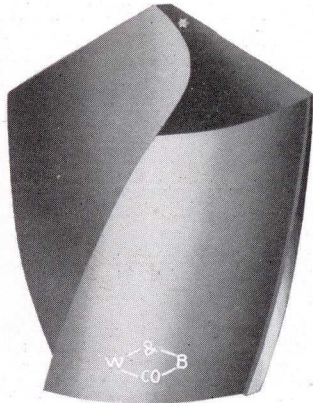


Diagram showing angle of Point.

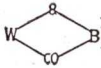


REALIZING the importance of a guide to inexperienced persons in grinding of drills with the proper point, we illustrate above a drill point correctly ground. Take any "W. & B." drill as received from the factory as a model.

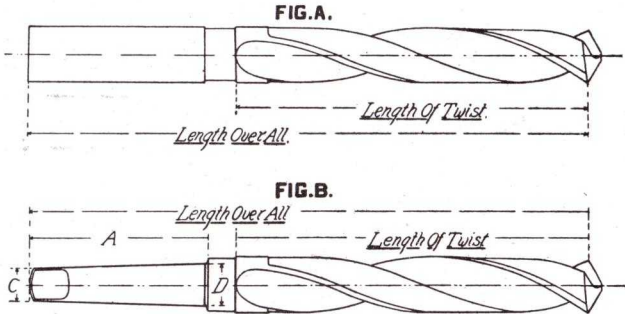
Care should be taken to preserve the angle of the line between the cutting edges, which should be about 125° , but never less than 120° . (See Diagram showing angle of point.) The preservation of the angle of this line is of the greatest importance. In our long experience we have seen more drills split from imperfect grinding at this point than from any other cause. As a proof of this we never have had a drill returned that split when used with the original factory grinding.

IMPORTANT

High speed drills should be ground on a medium grain, soft grade dry wheel and must not be immersed in water afterward.



DIRECTIONS FOR ORDERING SPECIAL DRILLS



FOR FRACTIONAL PART OF INCH, it is better to give decimal equivalent as we use micrometer calipers exclusively.

If Shank is standard give number. See next page.

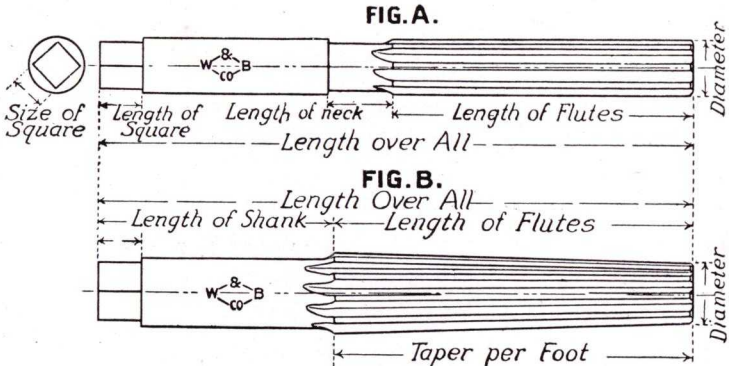
REGULAR DRILLS.—Always order by catalog number and state diameter.

SPECIAL DRILLS.—Refer to catalog number for general style of tool required, giving also the following information:

SPECIAL STRAIGHT SHANK DRILLS.—Give diameter and length over all and length of twist. See Fig. A.

SPECIAL TAPER SHANK DRILLS.—Give diameter and length over all and length of twist. See Fig. B. If a special taper shank is required give diameter at C and D and length A. If the shank has a tang, give thickness and length. If no tang, so state on the order.

DIRECTIONS FOR ORDERING SPECIAL REAMERS



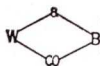
We will furnish Special Reamers to order and would request that reference be made to a number in this catalog for style required, in addition to the following information

HAND REAMERS—Diameter, length over all, length of flutes, see Figure "A"

TAPER REAMERS—Length over all, length of flutes, diameter at both ends of flutes or at one end and taper per foot, also style of shank or dimensions and sketch if Special Shank required. See Figure "B".

SHELL REAMERS—Diameter, length over all, length of flute, size of hole whether straight or taper, if latter give diameter at large and small ends.

ALWAYS STATE CLASS OF MATERIAL REAMER IS TO WORK IN



WRENCH SECTION

THE manufacturing of our complete line of DROP FORGED and SCREW WRENCHES at our Chicago factory is developed along the most modern lines with powerful machines and equipment.

The successive steps of using the Right Metals, the Heating, Forging, Milling, Finishing and Inspecting are carefully followed by experts in Wrench Manufacture.

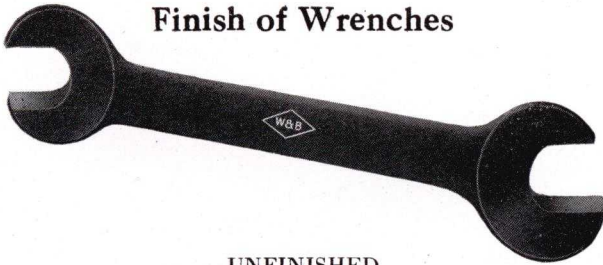
The results of this care has made "W. & B." "Diamond" Trade-Marked Wrenches a standard, with a world wide market and reputation for superior strength and service.

The line is the most complete and presents an assortment larger than that offered by any other manufacturer.

"W. & B." "Diamond" Trade-Marked Wrenches are models of wrench perfection in appearance and quality.

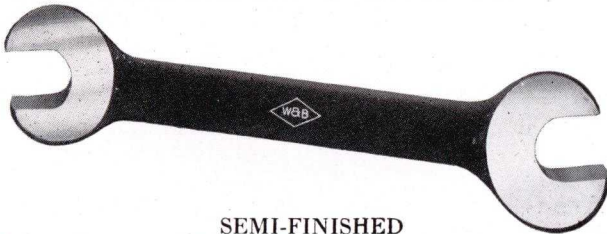
We can pack a greater variety of high grade wrenches in one shipment than any other manufacturer in the world.

Finish of Wrenches



UNFINISHED

Furnished with or without milled openings, not hardened.



SEMI-FINISHED

The openings are milled, heads polished, except as noted, and entire wrench hardened.



FINISHED

The openings are milled, heads brightened, entire wrench hardened, handle mottled and lacquered.

All Drop Forged Wrenches will be furnished with milled openings unless otherwise specified.

SPECIAL MILLING

Special Milling will be done to order without extra charge in lots of 100 or more on any size for which we have available the special tools necessary.

WHEN ORDERING

Please order by number and specify whether Unfinished, Semi-Finished or Finished Wrenches are wanted.

SPECIAL WRENCHES. Send us drawings or model with specifications, stating style of finish and give quantity, when we will be pleased to quote prices.



Engineers' Wrenches

SINGLE HEAD

15° ANGLE



No.	U. S. S. Nuts; Bolt Sizes	Milled Openings Ins.	Length Over All Ins.	Thickness of Head Ins.	PRICE EACH			No.
					Un- finished	Semi- finished	Finished	
00	1/8	5/16	2 1/2	1 1/8	\$0.09	\$0.14	\$0.22	00
0	3/16	1/2	2 7/8	1 1/8	.10	.15	.25	0
1	1/4	5/8	3 3/4	1 1/4	.12	.18	.28	1
2	5/16	3/4	4 3/4	1 1/2	.15	.22	.32	2
3	3/8	7/8	5 5/8	1 3/4	.18	.26	.38	3
4	7/16	1	6 1/2	1 3/4	.22	.32	.45	4
5	1/2	1 1/8	7 1/2	1 7/8	.26	.38	.54	5
6	9/16	1 1/4	8 3/8	1 7/8	.31	.46	.65	6
7	5/8	1 1/2	9 1/4	1 7/8	.40	.57	.82	7
8	3/4	1 3/4	11 1/8	1 7/8	.55	.75	1.05	8
9	7/8	1 7/8	13	2	.85	1.15	1.52	9
10	1	1 5/8	14 7/8	2	1.20	1.60	2.10	10
11	1 1/8	1 3/4	16 3/8	2 1/8	1.65	2.10	2.80	11
12	1 1/4	2	18 1/2	2 1/4	2.20	2.85	3.70	12
13	1 3/8	2 1/8	20 1/4	2 1/4	2.80	3.65	4.70	13
14	1 1/2	2 3/8	22 1/4	2 1/2	3.45	4.60	5.80	14
15	1 5/8	2 3/4	24	2 1/2	4.15	5.60	7.10	15
16	1 3/4	2 3/4	25 3/8	2 3/4	4.90	6.70	8.50	16
16 1/2	1 7/8	2 13/8	25 3/8	2 3/4	4.90	6.70	8.50	16 1/2
17	2	3 1/8	29 1/2	2 3/4	7.50	10.25	13.00	17
18	2 1/4	3 1/2	33	2 3/4	11.50	14.75	18.00	18
19	2 1/2	3 7/8	37	2 3/4	15.00	21.00	25.00	19
19 1/2	2 3/4	4 1/4	37	2 3/4	17.00	21.00	25.00	19 1/2
20	3	4 5/8	44	2 3/4	25.00	31.00	37.00	20
20A	3 1/4	5	44	2 3/4	25.00	31.00	37.00	20A
20B	3 1/2	5 3/8	51	2 3/4	40.00	52.00	64.00	20B
20C	3 3/4	5 3/4	51	2 3/4	40.00	52.00	64.00	20C
20D	4	6 1/8	53	2 3/4	40.00	52.00	64.00	20D
20E	4 1/2	6 7/8	53	2 3/4	80.00	102.00	124.00	20E
20F	5	7 3/8	53	2 3/4	80.00	102.00	124.00	20F

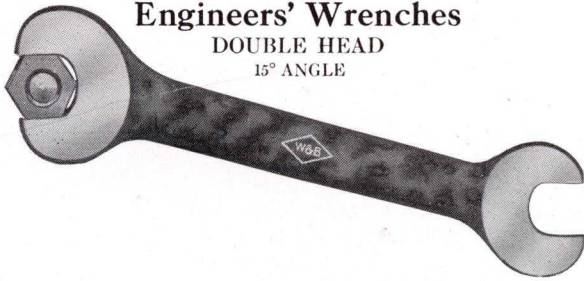
For Weights and Packing see pages 145-150; Special Conditions and Styles of Finish, page 103.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

Engineers' Wrenches

DOUBLE HEAD

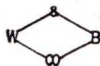
15° ANGLE



No.	U. S. S. Nuts; Bolt Sizes	Milled Openings Ins.	Length Over All Ins.	Thickness of Head Ins.	PRICE EACH			No.
					Un- finished	Semi- finished	Finished	
21	1/8 & 3/16	5/16 & 1/2	3 1/4	7/32 & 1/2	\$0.12	\$0.17	\$0.26	21
22	1/8 & 1/4	5/16 & 1/2	4	17/32 & 1/2	.14	.21	.32	22
23	3/16 & 1/4	5/16 & 1/2	4	17/32 & 1/2	.14	.21	.32	23
24	3/16 & 5/16	5/16 & 1/2	4 7/8	9/32 & 5/16	.17	.25	.38	24
25	1/4 & 5/16	1/2 & 1/2	4 7/8	9/32 & 5/16	.17	.25	.38	25
26	1/4 & 3/8	1/2 & 11/16	5 7/8	5/16 & 11/32	.21	.31	.46	26
27	5/16 & 3/8	1/2 & 11/16	5 7/8	5/16 & 11/32	.21	.31	.46	27
28	5/16 & 7/16	1/2 & 11/16	6 7/8	11/32 & 3/8	.25	.37	.56	28
29	3/8 & 7/16	1/2 & 11/16	6 7/8	11/32 & 3/8	.25	.37	.56	29
30	3/8 & 1/2	1 1/8 & 7/8	7 3/4	3/8 & 13/32	.30	.45	.68	30
31	7/16 & 1/2	1 1/8 & 7/8	7 3/4	3/8 & 13/32	.30	.45	.68	31
32	7/16 & 9/16	1 1/8 & 7/8	8 3/4	13/32 & 1/2	.37	.55	.85	32
33	1/2 & 9/16	1 1/8 & 7/8	8 3/4	13/32 & 1/2	.37	.55	.85	33
34	1/2 & 5/8	7/8 & 1 1/16	9 3/4	1/2 & 9/16	.46	.68	1.08	34
35	9/16 & 5/8	7/8 & 1 1/16	9 3/4	1/2 & 9/16	.46	.68	1.08	35
36	9/16 & 3/4	1 1/8 & 1 1/4	11 5/8	9/16 & 43/64	.66	.96	1.40	36
37	5/8 & 3/4	1 1/8 & 1 1/4	11 5/8	9/16 & 43/64	.66	.96	1.40	37
38	5/8 & 7/8	1 1/8 & 1 7/16	13 1/2	11/16 & 3/4	1.00	1.40	1.90	38
39	3/4 & 7/8	1 1/4 & 1 7/16	13 1/2	11/16 & 3/4	1.00	1.40	1.90	39
40	3/4 & 1	1 1/4 & 1 5/8	15 1/2	3/4 & 23/32	1.40	1.90	2.60	40
41	7/8 & 1	1 1/8 & 1 5/8	15 1/2	3/4 & 23/32	1.40	1.90	2.60	41
42	7/8 & 1 1/8	1 7/8 & 1 13/16	17 3/8	13/16 & 31/32	1.90	2.65	3.50	42
43	1 & 1 1/8	1 7/8 & 1 13/16	17 3/8	13/16 & 31/32	1.90	2.65	3.50	43
44	1 & 1 1/4	1 7/8 & 2	19 3/8	23/32 & 1 1/16	2.60	3.60	4.70	44
45	1 1/8 & 1 1/4	1 13/16 & 2	19 3/8	23/32 & 1 1/16	2.60	3.60	4.70	45
46	1 1/8 & 1 3/8	1 13/16 & 2 3/16	21 1/4	1 & 1 1/16	3.80	5.25	6.70	46
47	1 1/4 & 1 3/8	2 & 2 3/16	21 1/4	1 & 1 1/16	3.80	5.25	6.70	47
48	1 1/4 & 1 1/2	2 & 2 3/8	23 1/4	1 & 1 1/8	5.20	7.00	8.80	48
49	1 3/8 & 1 1/2	2 1/16 & 2 3/8	23 1/4	1 & 1 1/8	5.20	7.00	8.80	49
50	1 3/8 & 1 5/8	2 1/16 & 2 3/8	25 1/8	1 3/64 & 1 3/16	6.75	9.00	11.25	50
51	1 1/2 & 1 5/8	2 3/8 & 2 3/8	25 1/8	1 3/64 & 1 3/16	7.40	9.90	12.40	51
52	1 1/2 & 1 3/4	2 3/8 & 2 3/4	27 1/8	1 7/64 & 1 1/2	8.35	11.00	13.65	52
53	1 5/8 & 1 3/4	2 3/8 & 2 3/4	27 1/8	1 7/64 & 1 1/2	9.00	12.00	15.00	53
54	1 5/8 & 2	2 3/8 & 3 1/8	30 7/8	1 3/32 & 1 13/32	11.00	14.25	17.50	54
55	1 3/4 & 2	2 3/4 & 3 1/8	30 7/8	1 3/32 & 1 13/32	12.00	15.50	19.00	55
56	1 3/4 & 2 1/4	2 3/4 & 3 1/2	34 5/8	1 1/4 & 1 1/2	16.00	20.00	24.00	56
57	2 & 2 1/4	3 1/8 & 3 1/2	34 5/8	1 1/4 & 1 1/2	18.50	23.50	28.50	57

For Weights and Packing see pages 145-150; Special Conditions and Styles of Finish, page 103.

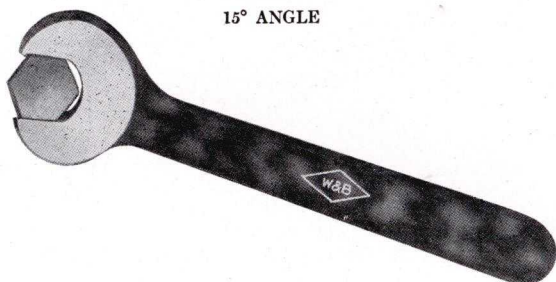
ALWAYS GIVE LIST NUMBER WHEN ORDERING



Hexagon Cap-Screw Wrenches

SINGLE HEAD

15° ANGLE



No.	For Hexagon Head Cap-Screws; Diameter of Screws	Milled Opening Ins.	Length Over All Ins.	Thick-ness of Heads; Ins.	PRICE EACH			No.
					Un-finished	Semi-finished	Finished	
700	3/16	3/8	2 7/8	7/32	\$0.10	\$0.15	\$0.25	700
701	1/4	7/16	3 3/4	1/4	.12	.18	.28	701
701A	5/16	1/2	3 3/4	1/4	.12	.18	.28	701A
702	3/8	9/16	4 3/4	21/64	.15	.22	.32	702
703	7/16	5/8	5 5/8	23/64	.18	.26	.38	703
704	1/2	3/4	6 1/2	25/64	.22	.32	.45	704
705	9/16	13/16	7 1/2	7/16	.26	.38	.54	705
705A	5/8	7/8	7 1/2	7/16	.26	.38	.54	705A
706	3/4	1	8 3/8	13/32	.31	.46	.65	706
707	7/8	1 1/8	9 1/4	1/2	.40	.57	.82	707
708	1	1 1/4	11 1/8	5/8	.55	.75	1.05	708

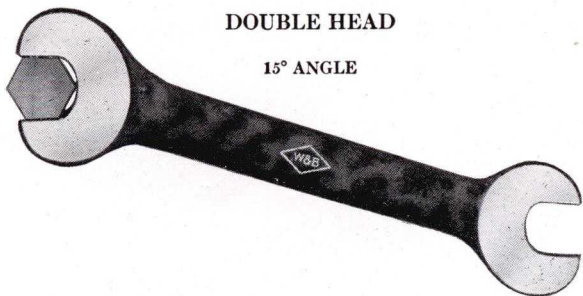
For Weights and Packing see pages 145-150; Special Conditions and Styles of Finish, page 103.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

Hexagon Cap-Screw Wrenches

DOUBLE HEAD

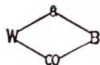
15° ANGLE



Number	For Hexagon Head Cap Screws; Diameter of Screws	Milled Openings Ins.	Length Over All Ins.	Thickness of Heads Ins.	PRICE EACH			Number
					Un-finished	Semi-finished	Finished	
723	3/16 & 1/4	3/8 & 7/16	4	17/64 & 19/64	\$0.14	\$0.21	\$0.32	723
723A	3/16 & 5/16	3/8 & 1/2	4	17/64 & 19/64	.14	.21	.32	723A
724	3/16 & 3/8	3/8 & 9/16	4 7/8	9/32 & 5/16	.17	.25	.38	724
725	1/4 & 5/16	7/16 & 1/2	4 7/8	9/32 & 5/16	.17	.25	.38	725
725A	1/4 & 3/8	7/16 & 9/16	4 7/8	9/32 & 5/16	.17	.25	.38	725A
725B	5/16 & 3/8	1/2 & 9/16	4 7/8	9/32 & 5/16	.17	.25	.38	725B
726	5/16 & 7/16	1/2 & 5/8	5 7/8	5/16 & 11/32	.21	.31	.46	726
727	3/8 & 7/16	9/16 & 5/8	5 7/8	5/16 & 11/32	.21	.31	.46	727
728	3/8 & 1/2	9/16 & 3/4	6 7/8	11/32 & 3/8	.25	.37	.56	728
729	7/16 & 1/2	5/8 & 3/4	6 7/8	11/32 & 3/8	.25	.37	.56	729
730	7/16 & 9/16	5/8 & 13/16	7 3/4	3/8 & 13/32	.30	.45	.68	730
731	1/2 & 9/16	3/4 & 13/16	7 3/4	3/8 & 13/32	.30	.45	.68	731
731A	1/2 & 5/8	3/4 & 7/8	7 3/4	3/8 & 13/32	.30	.45	.68	731A
731B	9/16 & 5/8	13/16 & 7/8	7 3/4	3/8 & 13/32	.30	.45	.68	731B
732	1/2 & 3/4	3/4 & 1	8 3/4	13/32 & 1/2	.37	.55	.85	732
732A	9/16 & 3/4	13/16 & 1	8 3/4	13/32 & 1/2	.37	.55	.85	732A
733	5/8 & 3/4	7/8 & 1	8 3/4	13/32 & 1/2	.37	.55	.85	733
734	5/8 & 7/8	7/8 & 1 1/8	9 3/4	1/2 & 9/16	.46	.68	1.08	734
735	3/4 & 7/8	1 & 1 1/8	9 3/4	1/2 & 9/16	.46	.68	1.08	735
736	3/4 & 1	1 & 1 1/4	11 5/8	9/16 & 43/64	.66	.96	1.40	736
737	7/8 & 1	1 1/8 & 1 1/4	11 5/8	9/16 & 43/64	.66	.96	1.40	737

For Weights and Packing see pages 145-150; Special Conditions and Styles of Finish, page 103.

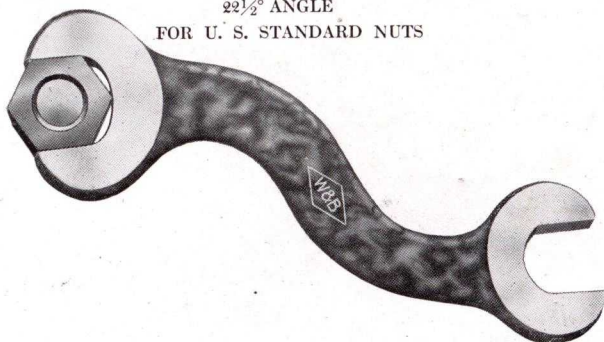
ALWAYS GIVE LIST NUMBER WHEN ORDERING



Double Head "S" Wrenches

22½° ANGLE

FOR U. S. STANDARD NUTS



No.	U. S. S. Nuts; Bolt Sizes	Milled Openings Ins.	Length Over All Ins.	Thickness of Heads Ins.	PRICE EACH			No.
					Un- finished	Semi- finished	Finished	
661A	1/8 & 3/16	5/16 & 13/32	4	9/32	\$0.15	\$0.22	\$0.32	661A
661B	1/8 & 1/4	5/16 & 1/2	4	9/32	.15	.22	.32	661B
661C	3/16 & 1/4	13/32 & 1/2	4	9/32	.15	.22	.32	661C
662A	3/16 & 5/16	13/32 & 19/32	5	5/16	.20	.29	.42	662A
662B	1/4 & 5/16	1/2 & 19/32	5	5/16	.20	.29	.42	662B
662C	1/4 & 3/8	1/2 & 11/16	5	5/16	.20	.29	.42	662C
663A	5/16 & 3/8	19/32 & 11/16	6 1/4	3/8	.27	.39	.56	663A
663B	5/16 & 7/16	19/32 & 25/32	6 1/4	3/8	.27	.39	.56	663B
663C	3/8 & 7/16	11/16 & 25/32	6 1/4	3/8	.27	.39	.56	663C
664A	3/8 & 1/2	11/16 & 7/8	7 1/2	7/16	.37	.53	.75	664A
664B	7/16 & 1/2	11/16 & 7/8	7 1/2	7/16	.37	.53	.75	664B
664C	7/16 & 9/16	25/32 & 31/32	7 1/2	7/16	.37	.53	.75	664C
665A	1/2 & 9/16	7/8 & 31/32	9	1/2	.50	.72	1.00	665A
665B	1/2 & 5/8	7/8 & 1 1/16	9	1/2	.50	.72	1.00	665B
665C	9/16 & 5/8	31/32 & 1 1/16	9	1/2	.50	.72	1.00	665C
666A	9/16 & 3/4	31/32 & 1 1/4	10 1/2	9/16	.74	1.00	1.35	666A
666B	5/8 & 3/4	1 1/16 & 1 1/4	10 1/2	9/16	.74	1.00	1.35	666B
666C	5/8 & 7/8	1 1/16 & 1 1/8	10 1/2	9/16	.74	1.00	1.35	666C
667A	3/4 & 7/8	1 1/4 & 1 7/16	12	5/8	1.10	1.45	1.90	667A
667B	3/4 & 1	1 1/4 & 1 5/8	12	5/8	1.10	1.45	1.90	667B
667C	7/8 & 1	1 7/16 & 1 5/8	12	5/8	1.10	1.45	1.90	667C
668A	7/8 & 1 1/8	1 7/16 & 1 13/16	14	25/32	1.90	2.50	3.20	668A
668B	1 & 1 1/8	1 5/8 & 1 13/16	14	25/32	1.90	2.50	3.20	668B
668C	1 & 1 1/4	1 5/8 & 2	14	25/32	1.90	2.50	3.20	668C

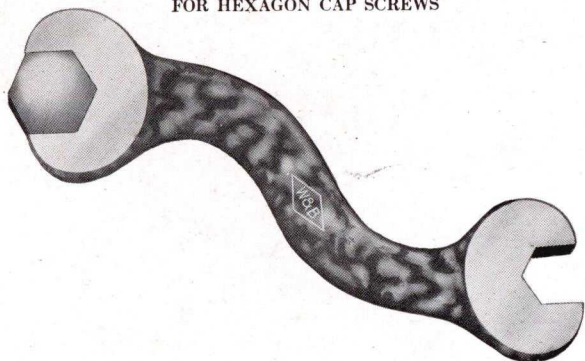
For Weights and Packing see pages 145-150; Special Conditions and Styles of Finish, page 103.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

Double Head "S" Wrenches

22½° ANGLE

FOR HEXAGON CAP SCREWS



No.	For Hexagon Head Cap Screws; Diameter Screws	Milled Openings Ins.	Length Over All Ins.	Thickness of Heads Ins.	PRICE EACH			No.
					Un- finished	Semi- finished	Finished	
671A	1/8 & 3/16	5/16 & 3/8	4	3/32	\$0.15	\$0.22	\$0.32	671A
671B	1/8 & 1/4	1/8 & 7/16	4	3/32	.15	.22	.32	671B
671C	3/16 & 1/4	3/8 & 1/2	4	3/32	.15	.22	.32	671C
671D	3/16 & 5/16	3/8 & 1/2	4	3/32	.15	.22	.32	671D
672A	1/4 & 5/16	1/8 & 1/2	5	1/8	.20	.29	.42	672A
672B	1/4 & 3/8	1/8 & 9/16	5	1/8	.20	.29	.42	672B
672C	5/16 & 3/8	1/2 & 1/2	5	1/8	.20	.29	.42	672C
672D	5/16 & 7/16	1/2 & 5/8	5	1/8	.20	.29	.42	672D
673A	3/8 & 7/16	1/8 & 5/8	6 1/4	3/8	.27	.39	.56	673A
673B	3/8 & 1/2	1/8 & 3/4	6 1/4	3/8	.27	.39	.56	673B
673C	7/16 & 1/2	5/8 & 3/4	6 1/4	3/8	.27	.39	.56	673C
673D	7/16 & 9/16	5/8 & 1 1/8	6 1/4	3/8	.27	.39	.56	673D
674A	1/2 & 9/16	3/4 & 1 1/8	7 1/2	1/2	.37	.53	.75	674A
674B	1/2 & 5/8	3/4 & 1 1/8	7 1/2	1/2	.37	.53	.75	674B
674C	9/16 & 5/8	1 1/8 & 7/8	7 1/2	1/2	.37	.53	.75	674C
675A	9/16 & 3/4	1 1/8 & 1	9	1/2	.50	.72	1.00	675A
675B	5/8 & 3/4	7/8 & 1	9	1/2	.50	.72	1.00	675B
675C	5/8 & 7/8	7/8 & 1 1/8	9	1/2	.50	.72	1.00	675C
675D	3/4 & 7/8	1 & 1 1/8	9	1/2	.50	.72	1.00	675D
676A	3/4 & 1	1 & 1 1/4	10 1/2	1/2	.74	1.00	1.35	676A
676B	7/8 & 1	1 1/8 & 1 1/4	10 1/2	1/2	.74	1.00	1.35	676B
676C	7/8 & 1 1/8	1 1/8 & 1 3/8	10 1/2	1/2	.74	1.00	1.35	676C
677A	1 & 1 1/8	1 1/4 & 1 3/8	12	5/8	1.10	1.45	1.90	677A
677B	1 & 1 1/4	1 1/4 & 1 1/2	12	5/8	1.10	1.45	1.90	677B
677C	1 1/8 & 1 1/4	1 3/8 & 1 1/2	12	5/8	1.10	1.45	1.90	677C

For Weights and Packing see pages 145-150; Special Conditions and Styles of Finish, page 103.

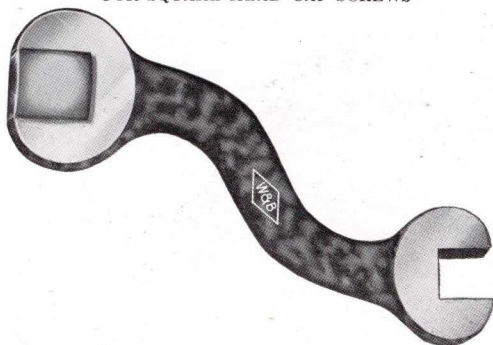
ALWAYS GIVE LIST NUMBER WHEN ORDERING



Double Head "S" Wrenches

22½° ANGLE

FOR SQUARE HEAD CAP SCREWS



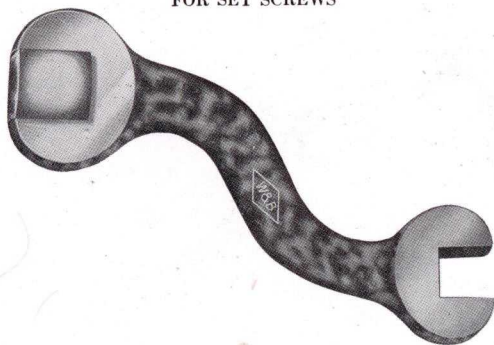
No.	For Square Head Cap Screws; Diameter Screws	Milled Opening Ins.	Length Over All Ins.	Thickness of Heads Ins.	PRICE EACH			No.
					Un- finished	Semi- finished	Fin- ished	
682A	1/4 & 5/16	3/8 & 7/16	5	5/16	\$0.20	\$0.29	\$0.42	682A
682B	1/4 & 3/8	3/8 & 1/2	5	5/16	.20	.29	.42	682B
682C	5/16 & 3/8	7/16 & 1/2	5	5/16	.20	.29	.42	682C
682D	5/16 & 7/16	7/16 & 9/16	5	5/16	.20	.29	.42	682D
683A	3/8 & 7/16	1/2 & 9/16	6 1/4	3/8	.27	.39	.56	683A
683B	3/8 & 1/2	1/2 & 5/8	6 1/4	3/8	.27	.39	.56	683B
683C	7/16 & 1/2	9/16 & 5/8	6 1/4	3/8	.27	.39	.56	683C
683D	7/16 & 9/16	9/16 & 1 1/16	6 1/4	3/8	.27	.39	.56	683D
684A	1/2 & 9/16	5/8 & 1 1/16	7 1/2	7/16	.37	.53	.75	684A
684B	1/2 & 5/8	5/8 & 3/4	7 1/2	7/16	.37	.53	.75	684B
684C	9/16 & 5/8	1 1/16 & 3/4	7 1/2	7/16	.37	.53	.75	684C
684D	9/16 & 3/4	1 1/16 & 7/8	7 1/2	7/16	.37	.53	.75	684D
685A	5/8 & 3/4	3/4 & 7/8	9	1/2	.50	.72	1.00	685A
686A	5/8 & 7/8	3/4 & 1 1/8	10 1/2	9/16	.74	1.00	1.35	686A
686B	3/4 & 7/8	7/8 & 1 1/8	10 1/2	9/16	.74	1.00	1.35	686B
686C	3/4 & 1	7/8 & 1 1/4	10 1/2	9/16	.74	1.00	1.35	686C
687A	7/8 & 1	1 1/8 & 1 1/4	12	5/8	1.10	1.45	1.90	687A
687B	7/8 & 1 1/8	1 1/8 & 1 3/8	12	5/8	1.10	1.45	1.90	687B
687C	1 & 1 1/8	1 1/4 & 1 3/8	12	5/8	1.10	1.45	1.90	687C
688A	1 & 1 1/4	1 1/4 & 1 1/2	14	25/32	1.90	2.50	3.20	688A
688B	1 1/8 & 1 1/4	1 3/8 & 1 1/2	14	25/32	1.90	2.50	3.20	688B

For Weights and Packing see pages 145-150; Special Conditions and Styles of Finish, page 103.

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Double Head "S" Wrenches

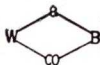
22½° ANGLE
FOR SET SCREWS



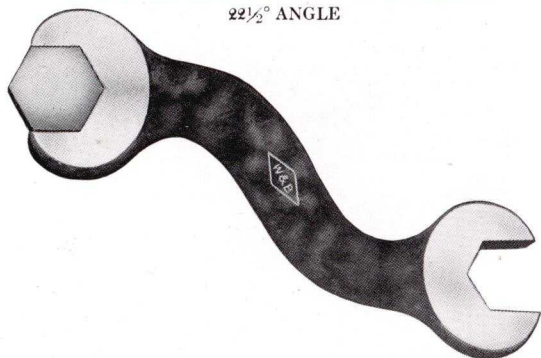
No.	For Set Screws; Diameter Screws	Milled Openings Ins.	Length Over All Ins.	Thickness of Heads	PRICE EACH			No.
					Un-finished	Semi-finished	Finished	
691A	1/4 & 5/16	1/4 & 5/16	4	9/32	\$0.15	\$0.22	\$0.32	691A
691B	1/4 & 3/8	1/4 & 3/8	4	9/32	.15	.22	.32	691B
691C	5/16 & 3/8	5/16 & 3/8	4	9/32	.15	.22	.32	691C
691D	5/16 & 7/16	5/16 & 7/16	4	9/32	.15	.22	.32	691D
692A	3/8 & 7/16	3/8 & 7/16	5	5/16	.20	.29	.42	692A
692B	3/8 & 1/2	3/8 & 1/2	5	5/16	.20	.29	.42	692B
692C	7/16 & 1/2	7/16 & 1/2	5	5/16	.20	.29	.42	692C
692D	7/16 & 9/16	7/16 & 9/16	5	5/16	.20	.29	.42	692D
693A	1/2 & 9/16	1/2 & 9/16	6 1/4	3/8	.27	.39	.56	693A
693B	1/2 & 5/8	1/2 & 5/8	6 1/4	3/8	.27	.39	.56	693B
693C	9/16 & 5/8	9/16 & 5/8	6 1/4	3/8	.27	.39	.56	693C
694A	9/16 & 3/4	9/16 & 3/4	7 1/2	7/16	.37	.53	.75	694A
694B	5/8 & 3/4	5/8 & 3/4	7 1/2	7/16	.37	.53	.75	694B
694C	5/8 & 7/8	5/8 & 7/8	7 1/2	7/16	.37	.53	.75	694C
695A	3/4 & 7/8	3/4 & 7/8	9	1/2	.50	.72	1.00	695A
695B	3/4 & 1	3/4 & 1	9	1/2	.50	.72	1.00	695B
695C	7/8 & 1	7/8 & 1	9	1/2	.50	.72	1.00	695C
696A	7/8 & 1 1/8	7/8 & 1 1/8	10 1/2	9/16	.74	1.00	1.35	696A
696B	1 & 1 1/8	1 & 1 1/8	10 1/2	9/16	.74	1.00	1.35	696B
696C	1 & 1 1/4	1 & 1 1/4	10 1/2	9/16	.74	1.00	1.35	696C
697A	1 1/8 & 1 1/4	1 1/8 & 1 1/4	12	5/8	1.10	1.45	1.90	697A

For Weights and Packing see pages 145-150; Special Conditions and Styles of Finish, page 103.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

**Double Head "S" Wrenches**

22½° ANGLE

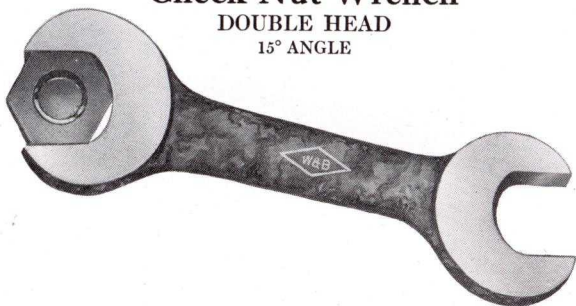


No.	Hexagon Cap Screws	Milled Openings, Ins.	Thick-ness of Head Ins.	Length Over All Ins.	PRICE EACH			No.
					Un-finished	Semi-finished	Fin-ished	
220	3/16 & 1/4	3/8 & 7/16	1/4 x 7/16	4	\$0.15	\$0.22	\$0.32	220
221	5/16 & 3/8	1/2 & 9/16	5/16 x 9/16	5	.27	.37	.52	221
222	1/2 & 9/16	3/4 & 13/16	3/8 x 11/16	6	.41	.57	.77	222
223	5/8 & 3/4	7/8 & 1	7/16 x 13/16	7	.57	.76	1.06	223
224	3/4 & 7/8	1 & 1 1/8	1/2 x 15/16	8	.72	.95	1.35	224
225	1 & 1 1/8	1 1/4 & 1 3/8	9/16 x 1 1/2	9	.90	1.20	1.65	225

Check-Nut Wrench

DOUBLE HEAD

15° ANGLE



No.	U. S. Standard Nuts, Bolt Sizes Ins.	Milled Openings Ins.	Length Over All Ins.	Thickness of Heads Ins.	PRICE EACH			No.
					Un-finished	Semi-finished	Finished	
97 1/2	3/4 & 7/8	1 1/4 & 1 7/16	8	1/2	\$0.60	\$0.80	\$1.10	97 1/2

Packed: Envelopes in bulk. Weight per dozen, 13 lbs. 5 oz.

For Weights and Packing see pages 145-150; Special Conditions and Styles of Finish, page 103.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

Check Nut Wrenches

SINGLE HEAD

15° ANGLE



No.	For U. S. Standard Nuts; Bolt Sizes	Milled Openings Ins.	Length Over All Ins.	Thickness of Head Ins.	PRICE EACH			No.
					Un-finished	Semi-finished	Finished	
800	5/16	3/32	4 1/4	5/32	.15	.22	.32	800
801	3/8	11/16	5 1/8	1/8	.18	.26	.38	801
802	7/16	3/8	5 7/8	1/4	.22	.32	.45	802
803	1/2	1/2	6 5/8	1/4	.26	.38	.54	803
804	9/16	5/8	7 3/8	3/32	.31	.45	.64	804
805	5/8	1 1/16	8 1/4	1/16	.38	.54	.76	805
806	3/4	1 1/4	10	3/8	.48	.68	.94	806
807	7/8	1 7/8	11 1/2	1/2	.68	.92	1.25	807
808	1	1 3/8	13 1/4	1 1/2	1.00	1.30	1.70	808

Check Nut Wrenches

DOUBLE HEAD

15° ANGLE



No.	For U. S. Standard Nuts; Bolt Sizes	Milled Openings Ins.	Length Over All Ins.	Thickness of Heads Ins.	PRICE EACH			No.
					Un-finished	Semi-finished	Finished	
819	3/16 & 1/4	13/32 & 1/2	4 3/8	9/64 & 5/32	.17	.25	.38	819
820	3/16 & 5/16	13/32 & 13/32	4 3/8	9/64 & 5/32	.17	.25	.38	820
821	1/4 & 5/16	1/2 & 13/32	4 3/8	9/64 & 5/32	.17	.25	.38	821
822	1/4 & 3/8	1/2 & 1/2	5 1/2	3/32 & 1/16	.22	.32	.48	822
822A	3/8 & 7/16	5/8 & 1/2	5 1/2	3/32 & 1/16	.22	.32	.48	822A
823	5/16 & 3/8	13/32 & 1/2	5 1/2	3/32 & 1/16	.22	.32	.48	823
824	5/16 & 7/16	13/32 & 5/8	5 1/2	3/32 & 1/16	.22	.32	.48	824
825	3/8 & 7/16	11/16 & 1/2	6 7/8	1/16 & 3/32	.28	.40	.60	825
826	3/8 & 1/2	11/16 & 7/8	6 7/8	1/16 & 3/32	.28	.40	.60	826
827	7/16 & 1/2	5/8 & 7/8	6 7/8	1/16 & 3/32	.28	.40	.60	827
828	7/16 & 9/16	5/8 & 3/2	8 1/2	3/32 & 3/32	.40	.56	.80	828
829	1/2 & 9/16	7/8 & 3/2	8 1/2	3/32 & 3/32	.40	.56	.80	829
330	1/2 & 5/8	7/8 & 1 1/8	8 1/2	1/32 & 9/32	.40	.56	.80	830
831	9/16 & 5/8	31/32 & 1 1/8	10 3/8	1/32 & 9/32	.60	.84	1.15	831
832	9/16 & 3/4	31/32 & 1 1/4	10 3/8	1/32 & 9/32	.60	.84	1.15	832
833	5/8 & 3/4	1 1/16 & 1 1/4	10 3/8	1/32 & 9/32	.60	.84	1.15	833
834	5/8 & 7/8	1 1/8 & 1 7/8	12 3/8	1/16 & 1/16	1.00	1.30	1.75	834
835	3/4 & 1	1 1/4 & 1 7/8	12 3/8	1/16 & 1/16	1.00	1.30	1.75	835
836	3/4 & 1	1 1/4 & 1 7/8	12 3/8	1/16 & 1/16	1.00	1.30	1.75	836

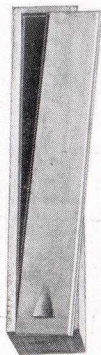
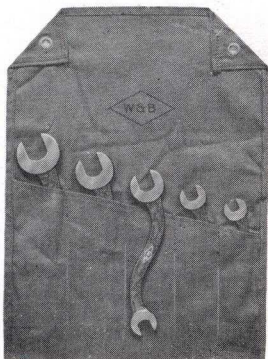
For Weights and Packing see pages 145-150; Special Conditions and Styles of Finish, page 103.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



General Purpose Wrenches in Sets

EACH SET PACKED IN A CANVAS ROLL OR NEAT WOODEN BOX



SET A

The openings on wrenches in sets "A" and "B" are specially adapted for use on Carriages, Wagons and Agricultural Implements.

Contains 5 Wrenches.

No.	Manufacturers' Standard Nuts; Bolt Sizes	Milled Openings Ins.	Length Over All Ins.	Thick-ness of Heads Ins.	PRICE EACH			No.
					Un-finished	Semi-finished	Finished	
500	3/16 & 1/4	3/8 & 1/2	6 1/4	7/32	\$0.18	\$0.27	\$0.38	500
501	1/4 & 5/16	1/2 & 5/8	7 1/8	1/4	.23	.34	.47	501
502	5/16 & 3/8	5/8 & 3/4	8 1/4	5/16	.29	.43	.58	502
503	3/8 & 7/16	3/4 & 7/8	9 1/4	3/8	.38	.55	.72	503
504	7/16 & 1/2	7/8 & 1	10 3/8	7/16	.50	.70	.90	504
Price per set, in bulk					1.58	2.29	3.05	
Price per set, in wooden box					1.74	2.45	3.21	
Price per set, in canvas roll					2.03	2.74	3.50	

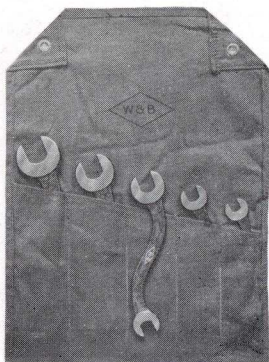
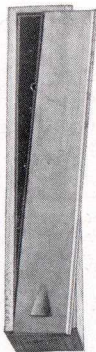
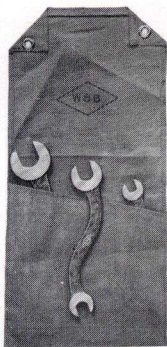
SET B

Contains 3 Wrenches.

No.	Manufacturers' Standard Nuts; Bolt Sizes	Milled Openings Ins.	Length Over All Ins.	Thick-ness of Heads Ins.	PRICE EACH			No.
					Un-finished	Semi-finished	Finished	
500	3/16 & 1/4	3/8 & 1/2	6 1/4	7/32	\$0.18	\$0.27	\$0.38	500
502	5/16 & 3/8	5/8 & 3/4	8 1/4	5/16	.29	.43	.58	502
504	7/16 & 1/2	7/8 & 1	10 3/8	7/16	.50	.70	.90	504
Price per set, in bulk .....					.97	1.40	1.86	
Price per set, wooden box					1.11	1.54	2.00	
Price per set, canvas roll					1.32	1.75	2.21	

For Weights and Packing see pages 145-150; Special Conditions and Styles of Finish, page 103.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



SET C. FOR GENERAL SERVICE

Contains 3 Wrenches.

No.	U. S. Standard Nuts; Bolt Sizes	Milled Openings Ins.	Length Over All Ins.	Thick-ness of Heads Ins.	PRICE EACH			No.
					Un-finished	Semi-finished	Finished	
500B	3/16 & 1/4	1 3/32 & 1/2	6 1/4	7/32	\$0.18	\$0.27	\$0.38	500B
501B	5/16 & 3/8	1 9/32 & 11/16	7 1/8	1/4	.23	.34	.47	501B
503B	7/16 & 1/2	1 25/32 & 7/8	9 1/4	3/8	.38	.55	.72	503B
Price per set, in bulk					.79	1.16	1.57	
Price per set, wooden box					.93	1.30	1.71	
Price per set, canvas roll					1.14	1.51	1.92	

SET D. FOR AUTOMOBILES

Contains 5 Wrenches, for A. L. A. M. Standard Nuts and Cap Screws.

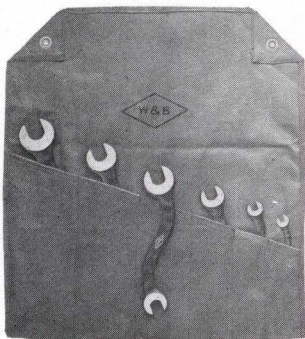
No.	For A. L. A. M. Standard Nuts, and Cap Screws; Bolt Sizes or Cap Screws	Milled Openings Ins.	Length Over All Ins.	Thick-ness of Heads Ins.	PRICE EACH			No.
					Un-finished	Semi-finished	Finished	
500	1/4 & 5/16	3/8 & 1/2	6 1/4	7/32	\$0.18	\$0.27	\$0.38	500
502A	3/8 & 7/16	9/16 & 11/16	8 1/4	5/16	.29	.43	.58	502A
503	1/2 & 9/16	3/4 & 7/8	9 1/4	3/8	.38	.55	.72	503
504A	5/8 & 11/16	15/16 & 1	10 3/8	7/16	.50	.70	.90	504A
505C	3/4 & 7/8	1 1/8 & 1 1/4	12	1/2	.70	1.00	1.30	505C
Price per set, in bulk					2.05	2.95	3.88	
Price per set, wooden box					2.21	3.11	4.04	
Price per set, canvas roll					2.50	3.40	4.33	

For Weights and Packing see pages 145-150; Special Conditions and Styles of Finish, page 103.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



General Purpose Wrenches in Sets—Continued



SET E. FOR GENERAL SERVICE

Contains six wrenches, twelve much used openings, no duplicates.

No.	Hex. Nuts	Hex. Head Cap Screws	Square Head Cap Screws	Milled Openings and Set Screws	Thickness of Heads Ins.	Length Over All Ins.	PRICE EACH			No.
							Un-finished	Semi-finished	Fin-ished	
500A		3/16 & 1/4	1/4 & 5/16	3/8 & 7/16	7/32	6 1/4	\$0.18	\$0.27	\$0.38	500A
501A	1/4	5/16 & 3/8	3/8 & 7/16	1/2 & 9/16	1/4	7 3/8	.23	.34	.47	501A
502B	3/8	7/16	1/2 & 9/16	5/8 & 11/16	5/16	8 1/4	.29	.43	.58	502B
503A		1/2 & 9/16	5/8	3/4 & 13/16	3/8	9 1/4	.38	.55	.72	503A
504	1/2	5/8 & 3/4	3/4	7/8 & 1	7/8	10 3/8	.50	.70	.90	504
505C	3/4	7/8 & 1	7/8 & 1	1 1/8 & 1 1/4	1 1/8	12	.70	1.00	1.30	505C
Price per set, in bulk							2.28	3.29	4.35	
Price per set, in wooden box							2.44	3.45	4.51	
Price per set, in canvas roll							2.73	3.74	4.80	

SET F. FOR AUTOMOBILES

Contains six wrenches, twelve openings, no duplicates.

No.	Hex. Nuts	Set Screws	Hex. Head Cap Screws	Square Head Cap Screws	Milled Openings Ins.	Thickness of Heads Ins.	Length Over All Ins.	PRICE EACH			No.
								Un-finished	Semi-finished	Fin-ished	
500C	1/8	1/4 & 5/16	1/8		1/4 & 5/16	7/16	6 1/4	\$0.18	\$0.27	\$0.38	500C
500A		3/8 & 7/16	3/16 & 1/4	1/4 & 5/16	3/8 & 7/16	7/32	6 1/4	.18	.27	.38	500A
501C	3/16 & 1/4	1/2	5/16	3/8	1/2 & 5/8	1/4	7 3/8	.23	.34	.47	501C
502C	5/16	9/16	3/8	7/16	5/8 & 11/16	5/16	8 1/4	.29	.43	.58	502C
503C	3/8	5/16	3/4	1/2	9/16 & 5/8	3/8	9 1/4	.38	.55	.72	503C
504B	1/2 & 5/8	7/8	5/8	3/4	7/8 & 1 1/8	7/8	10 3/8	.50	.70	.90	504B
Price per set, in bulk							1.76	2.56	3.43		
Price per set, in wooden box							1.92	2.72	3.59		
Price per set, in canvas roll							2.21	3.01	3.88		

For Weights and Packing see pages 145-150; Special Conditions and Styles of Finish, page 103.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

General Purpose Wrenches

22½° ANGLE



For Carriage and Automobile Trade and for General Service in which a long, light wrench is required.

No.	Milled Openings Ins	Length Over All Ins	Thickness of Heads Ins	PRICE EACH			No.
				Un- finished	Semi- finished	Finished	
500	3/8 & 1/2	6 1/4	7/32	\$0.18	\$0.27	\$0.38	500
500A	3/8 & 7/16	6 1/4	7/32	.18	.27	.38	500A
500B	13/32 & 1/2	6 1/4	7/32	.18	.27	.38	500B
500C	1/4 & 5/16	6 1/4	7/32	.18	.27	.38	500C
501	1/2 & 5/8	7 1/8	1/4	.23	.34	.47	501
501A	1/2 & 9/16	7 1/8	1/4	.23	.34	.47	501A
501B	19/32 & 11/16	7 1/8	1/4	.23	.34	.47	501B
501C	13/32 & 1/2	7 1/8	1/4	.23	.34	.47	501C
502	5/8 & 3/4	8 1/4	5/16	.29	.43	.58	502
502A	9/16 & 11/16	8 1/4	5/16	.29	.43	.58	502A
502B	5/8 & 11/16	8 1/4	5/16	.29	.43	.58	502B
502C	9/16 & 19/32	8 1/4	5/16	.29	.43	.58	502C
503	3/4 & 7/8	9 1/4	3/8	.38	.55	.72	503
503A	3/4 & 13/16	9 1/4	3/8	.38	.55	.72	503A
503B	25/32 & 7/8	9 1/4	3/8	.38	.55	.72	503B
503C	11/16 & 3/4	9 1/4	3/8	.38	.55	.72	503C
504	7/8 & 1	10 3/8	7/16	.50	.70	.90	504
504A	15/16 & 1	10 3/8	7/16	.50	.70	.90	504A
504B	7/8 & 1 1/16	10 3/8	7/16	.50	.70	.90	504B
505	1 & 1 1/8	12	1/2	.70	1.00	1.30	505
505A	1 & 1 1/4	12	1/2	.70	1.00	1.30	505A
505B	1 1/16 & 1 1/4	12	1/2	.70	1.00	1.30	505B
505C	1 1/8 & 1 1/4	12	1/2	.70	1.00	1.30	505C

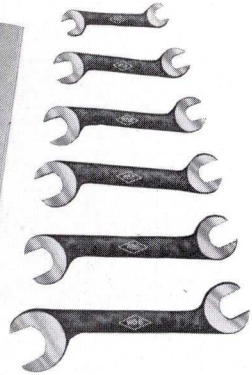
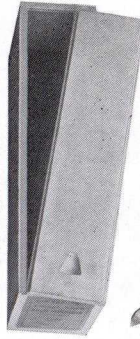
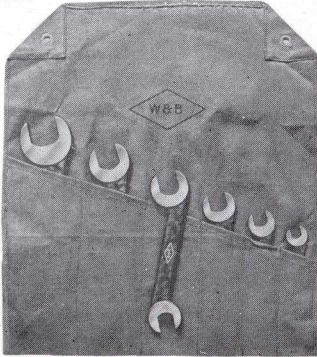
For Weights and Packing see pages 145-150; Special Conditions and Styles of Finish, page 103.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Double Head Angle Wrenches in Sets

EACH SET PACKED IN A CANVAS BAG OR ROLL OR IN A NEAT WOODEN BOX



SET NO. 1

Contains 6 Wrenches

No.	U. S. Standard Hexagon Nuts; Bolt Sizes	Milled Openings Ins.	Length Over All Ins.	Thickness of Heads Ins.	PRICE EACH			No.
					Un-finished	Semi-finished	Finished	
550	3/16 & 1/4	3/8 & 1/2	4 1/2	1/4	\$0.17	\$0.25	\$0.38	550
551	5/16 & 3/8	19/32 & 11/16	5 3/4	9/32	.21	.31	.46	551
552	3/8 & 1/2	11/16 & 7/8	7	5/16	.27	.40	.60	552
553	7/16 & 9/16	25/32 & 31/32	8	11/32	.36	.53	.78	553
554	9/16 & 5/8	31/32 & 1 1/16	9 1/4	3/8	.50	.72	1.05	554
555	5/8 & 7/8	1 1/16 & 1 7/16	10 1/2	7/16	.68	.96	1.40	555
Price per set, in bulk					2.19	3.17	4.67	
Price per set, wooden box					2.35	3.33	4.83	
Price per set, canvas roll					2.64	3.62	5.12	

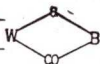
SET No. 2

Contains 6 Wrenches, twelve openings, no duplicates.

No.	Milled Openings Ins.	Length Over All Ins.	Thickness of Heads Ins.	PRICE EACH			No.
				Un-finished	Semi-finished	Finished	
550A	3/8 & 7/16	4 1/2	1/4	\$0.17	\$0.25	\$0.38	550A
551A	9/16 & 5/8	5 3/4	9/32	.21	.31	.46	551A
552A	11/16 & 13/16	7	5/16	.27	.40	.60	552A
553A	3/4 & 1 1/16	8	11/32	.36	.53	.78	553A
554A	7/8 & 1	9 1/4	3/8	.50	.72	1.05	554A
555A	1 1/16 & 1 5/16	10 1/2	7/16	.68	.96	1.40	555A
Price per set, in bulk				2.19	3.17	4.67	
Price per set, wooden box				2.35	3.33	4.83	
Price per set, canvas roll				2.64	3.62	5.12	

For Weights and Packing see pages 145-150; Special Conditions and Styles of Finish, page 103.

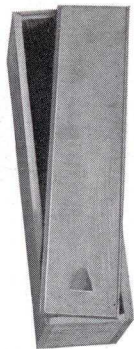
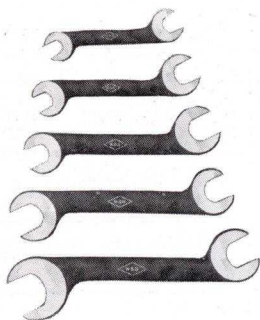
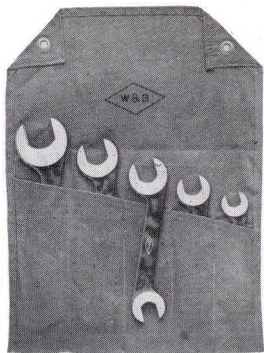
ALWAYS GIVE LIST NUMBER WHEN ORDERING



Textile Machine Wrenches in Sets

DOUBLE HEAD

22½° ANGLE



These openings cover all Bolt sizes from $\frac{3}{16}$ to $\frac{7}{8}$ in.

No.	For U. S. Standard Hexagon Nuts; Bolt Sizes	Milled Openings Ins.	Length Over All Ins.	Thick- ness of Head Ins.	PRICE EACH			No.
					Un- finished	Semi- finished	Finished	
601	$\frac{3}{16}$ & $\frac{1}{4}$	$\frac{13}{32}$ & $\frac{1}{2}$	$4\frac{1}{2}$	$\frac{1}{4}$	\$0.17	\$0.25	\$0.38	601
610	$\frac{5}{16}$ & $\frac{3}{8}$	$\frac{19}{32}$ & $\frac{11}{16}$	$5\frac{3}{4}$	$\frac{9}{32}$	.21	.31	.46	610
615A	$\frac{7}{16}$ & $\frac{1}{2}$	$\frac{25}{32}$ & $\frac{7}{8}$	8	$\frac{11}{32}$	.36	.53	.78	615A
621	$\frac{9}{16}$ & $\frac{5}{8}$	$\frac{31}{32}$ & $1\frac{1}{16}$	$9\frac{1}{4}$	$\frac{3}{8}$	.50	.72	1.05	621
624	$\frac{3}{4}$ & $\frac{7}{8}$	$1\frac{1}{4}$ & $1\frac{7}{16}$	$10\frac{1}{2}$	$\frac{7}{16}$	.68	.96	1.40	624
Price per set, in bulk.....					1.92	2.77	4.07	
Price per set, in wooden box.....					2.08	2.93	4.23	
Price per set, in canvas roll.....					2.37	3.22	4.52	

For Weights and Packing see pages 145-150; Special Conditions and Styles of Finish, page 103.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Double Head Angle Wrenches

92 1/2° ANGLE

No.	U. S. S. Nuts; Bolt Sizes	For Set Screws; Size	For Square Head Cap Screws; Dia. Screw	For Hexagon Head Cap Screws; Dia. Screw	Milled Openings Ins.	Length Over All Ins.	Thickness Of Head Ins.	PRICE EACH		No.
								Up-finished	Semi-finished		Finished
600	3/16 & 1/4	3/8 & 7/16	1/4 & 5/16	3/16 & 1/4	3/8 & 1/2	4 1/2	1/4	\$0.17	\$0.25	600
601	3/16 & 1/4	3/8 & 1/2	1/4 & 3/8	3/16 & 5/16	3/8 & 1/2	4 1/2	1/4	.17	.25	601
602	3/16 & 1/4	7/16 & 1/2	5/16 & 3/8	1/4 & 5/16	1/2 & 5/8	4 1/2	1/4	.17	.25	602
603	3/16 & 1/4	1/2 & 9/16	3/8 & 7/16	5/16 & 3/8	1/2 & 5/8	5 3/4	3/8	.21	.31	603
604	3/16 & 1/4	1/2 & 9/16	3/8 & 7/16	5/16 & 3/8	1/2 & 5/8	5 3/4	3/8	.21	.31	604
605	1/4 & 5/16	1/2 & 5/8	3/8 & 1/2	5/16 & 7/16	1/2 & 5/8	5 3/4	3/8	.21	.31	605
606	1/4 & 5/16	1/2 & 5/8	3/8 & 1/2	5/16 & 7/16	1/2 & 5/8	5 3/4	3/8	.21	.31	606
607	1/4 & 5/16	1/2 & 5/8	3/8 & 1/2	5/16 & 7/16	1/2 & 5/8	5 3/4	3/8	.21	.31	607
608	1/4 & 5/16	1/2 & 5/8	3/8 & 1/2	5/16 & 7/16	1/2 & 5/8	5 3/4	3/8	.21	.31	608
609	5/16 & 3/8	9/16 & 5/8	7/16 & 1/2	3/8 & 7/16	1/2 & 5/8	5 3/4	3/8	.21	.31	609
610	5/16 & 3/8	9/16 & 5/8	7/16 & 1/2	3/8 & 7/16	1/2 & 5/8	5 3/4	3/8	.21	.31	610
611	3/8 & 1/2	3/4 & 1	9/16 & 3/4	1/2 & 5/8	3/4 & 1	7	3/8	.27	.40	611
612	3/8 & 1/2	3/4 & 1	9/16 & 3/4	1/2 & 5/8	3/4 & 1	7	3/8	.27	.40	612
613	7/16 & 1/2	3/4 & 1	5/8 & 3/4	1/2 & 5/8	3/4 & 1	7	3/8	.27	.40	613
614	7/16 & 1/2	3/4 & 1	5/8 & 3/4	1/2 & 5/8	3/4 & 1	7	3/8	.27	.40	614
615	7/16 & 9/16	3/4 & 1	5/8 & 3/4	1/2 & 5/8	3/4 & 1	8	3/8	.36	.53	615
615A	7/16 & 9/16	3/4 & 1	5/8 & 3/4	1/2 & 5/8	3/4 & 1	8	3/8	.36	.53	615A
616	1/2 & 9/16	7/8 & 1	3/4 & 1	1/2 & 3/4	3/4 & 1	8	3/8	.36	.53	616
617	1/2 & 9/16	7/8 & 1	3/4 & 1	1/2 & 3/4	3/4 & 1	8	3/8	.36	.53	617
618	1/2 & 9/16	7/8 & 1	3/4 & 1	1/2 & 3/4	3/4 & 1	8	3/8	.36	.53	618
619	1/2 & 9/16	7/8 & 1	3/4 & 1	1/2 & 3/4	3/4 & 1	8	3/8	.36	.53	619
620	1/2 & 9/16	7/8 & 1	3/4 & 1	1/2 & 3/4	3/4 & 1	9 1/4	3/8	.50	.72	620
621	1/2 & 9/16	7/8 & 1	3/4 & 1	1/2 & 3/4	3/4 & 1	9 1/4	3/8	.50	.72	621
622	5/8 & 7/8	7/8 & 1 1/8	3/4 & 7/8	5/8 & 7/8	1 1/8 & 1 1/8	9 1/2	3/8	.50	.72	622
623	5/8 & 7/8	7/8 & 1 1/8	3/4 & 7/8	5/8 & 7/8	1 1/8 & 1 1/8	10 1/2	3/8	.68	.96	623
624	5/8 & 7/8	7/8 & 1 1/8	3/4 & 7/8	5/8 & 7/8	1 1/8 & 1 1/8	10 1/2	3/8	.68	.96	624

For Weights and Packing see pages 145-150; Special Conditions and Styles of Finish, page 103.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

Double-Head Tool Post Wrenches

FOR U. S. STANDARD NUTS AND SET SCREWS



Holes Broached. Closed end, $22\frac{1}{2}^\circ$ angle. Open end Straight.

No.	Open End for U. S. Standard Nuts		Closed End for Set Screws Size Ins.	Length Over All Ins.	Thickness of Heads Ins.	PRICE EACH			No.
	Bolt sizes	Milled Openings Ins.				Un-finished	Semi-finished	Finished	
124	3/8	11/16	9/16	6 1/2	1/2 & 5/8	\$0.48	\$0.66	\$0.96	124
129	1/2	7/8	7/16	7	5/8 & 3/2	.52	.72	1.04	129
131	1/2	7/8	9/16	7	5/8 & 3/2	.52	.72	1.04	131
132	1/2	7/8	5/8	7	5/8 & 2 1/2	.52	.72	1.04	132
139	5/8	1 1/16	5/8	7 1/2	2 1/2 & 2 1/2	.60	.82	1.16	139
140	5/8	1 1/16	3/4	8	2 1/2 & 1 1/2	.72	.97	1.34	140
143	3/4	1 1/4	3/4	9	3/4 & 1 1/2	.90	1.20	1.60	143

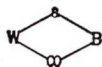
Single-Head Set Screw Wrenches



No.	For Set Screws; Size	Length Over All Ins.	Thickness of Heads Ins.	PRICE EACH			No.
				Unfinished	Semi-Finished	Finished	
280	3/16	3	7/32	\$0.10	\$0.14	\$0.23	280
281	1/4	3 5/8	3/32	.12	.17	.27	281
282	5/16	4 1/2	1/16	.14	.21	.31	282
283	3/8	5 3/8	3/8	.17	.25	.37	283
284	7/16	6 1/4	13/32	.21	.31	.45	284
285	1/2	7	1 3/2	.26	.38	.54	285
286	9/16	7 1/2	1 3/2	.31	.45	.65	286
287	5/8	8	1 9/2	.38	.65	.80	287
288	3/4	9 1/4	2 1/2	.48	.68	.98	288
289	7/8	10 1/2	2 3/2	.60	.84	1.20	289
290	1	11 1/2	2 3/2	.80	1.10	1.48	290
291	1 1/8	12	2 7/2	1.10	1.40	1.80	291

For Weights and Packing see pages 145-150; Special Conditions and Styles of Finish, page 103.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Double Head Set Screw Tool Post Wrenches



These Wrenches can also be used on Cap Screws.

No.	Open End for Set Screws; Size	Closed End for Set Screws; Size	Length Over All Ins.	Thickness of Heads Ins.	PRICE EACH			No.
					Unfinished	Semi-Finished	Finished	
201	7/16	7/16	5 1/2	1 1/2 & 1 1/2	\$0.40	\$0.56	\$0.80	201
202	1/2	1/2	6	1 1/2 & 1 1/2	.44	.62	.88	202
203	9/16	1/2	6	1 1/2 & 1 1/2	.44	.62	.88	203
204	5/8	5/8	6 3/4	2 1/2 & 2 1/2	.52	.72	1.00	204
205	11/16	5/8	6 3/4	2 1/2 & 2 1/2	.52	.72	1.00	205
206	3/4	3/4	7 1/2	2 1/2 & 2 1/2	.60	.82	1.16	206

Closed end, 22 1/2° angle, hole broached. Open end straight.

Single Head Box Wrenches

22 1/2° ANGLE



No.	For Set Screws; Size	Length Over All Ins.	Thickness of Head Ins.	Outside Diam. Ins.	PRICE EACH			No.
					Unfinished	Semi-Finished	Finished	
250	1/4	3 3/8	5/32	5/8	\$0.12	\$0.17	\$0.27	250
251	5/16	3 3/4	1/8	2 3/8	.14	.20	.31	251
252	3/8	4 1/4	3/8	1 3/8	.16	.24	.35	252
253	7/16	4 7/8	7/16	1 1/2	.19	.28	.40	253
254	1/2	5 1/2	1/2	1 5/8	.23	.34	.48	254
255	9/16	6 1/4	9/16	1 3/8	.28	.41	.58	255
256	5/8	7	5/8	1 3/8	.35	.50	.70	256
257	3/4	8	2 1/2	1 1/2	.44	.62	.85	257
258	7/8	9	2 3/4	1 3/4	.60	.81	1.10	258
259	1	10	3 1/4	2	.80	1.05	1.40	259

For Weights and Packing see pages 145-150; Special Conditions and Styles of Finish, page 103.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Double Head Set Screw Wrenches

15° ANGLE

No.	For Set Screws; Size	Length Over All Ins.	Thickness of Head Ins.	PRICE EACH			No.
				Unfinished	Semi-Finished	Finished	
65	3/16 & 1/4	3 3/8	1/4 & 9/32	\$0.14	\$0.20	\$0.30	65
66	3/16 & 5/16	3 3/8	1/4 & 9/32	.16	.24	.35	66
67	1/4 & 5/16	4	1/4 & 5/16	.16	.24	.35	67
68	1/4 & 3/8	4	1/4 & 5/16	.19	.29	.42	68
69	5/16 & 3/8	5	5/16 & 11/32	.19	.29	.42	69
70	5/16 & 7/16	5	5/16 & 11/32	.24	.35	.52	70
71	3/8 & 7/16	5 7/8	3/8 & 13/32	.24	.35	.52	71
72	3/8 & 1/2	5 7/8	3/8 & 13/32	.30	.45	.66	72
73	7/16 & 1/2	6 5/8	13/32 & 13/32	.30	.45	.66	73
74	7/16 & 9/16	6 5/8	13/32 & 13/32	.36	.54	.80	74
75	1/2 & 9/16	7 1/2	1/2 & 13/32	.36	.54	.80	75
76	1/2 & 5/8	7 1/2	1/2 & 17/32	.44	.65	.96	76
77	9/16 & 5/8	8 3/8	1/2 & 17/32	.44	.65	.96	77
78	9/16 & 3/4	8 3/8	1/2 & 17/32	.56	.80	1.15	78
79	5/8 & 3/4	10	19/32 & 21/32	.56	.80	1.15	79
80	5/8 & 7/8	10	19/32 & 21/32	.72	1.00	1.40	80
81	3/4 & 7/8	11 3/8	21/32 & 23/32	.72	1.00	1.40	81
82	3/4 & 1	11 3/8	21/32 & 23/32	.98	1.30	1.75	82



Triple Head Set Screw Wrench

For Set Screws	Length Over All, Ins.	Thickness of Heads, Ins.	PRICE EACH		
			Unfinished	Semi-Finished	Finished
1/2 5/8 3/4	5 5/8	3/8	\$0.40	\$0.56	\$0.80

Packed: Finished, Envelopes in bulk. Weight per dozen, 8 lbs. 3 oz.
For Weights and Packing see pages 145-150; Special Conditions and
Styles of Finish, page 103.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Construction and Car Builders' Wrenches

15° ANGLE



The round tang is for bringing bolt and rivet holes into line. The correct tool for use in the construction of roofs, bridges, cars, etc., and can be inserted into convenient openings when wrench is not in use, always keeping tool in sight and preventing loss.

The openings are 15 degrees angle with the handle which admits turning a hexagon nut completely around, where the swing of the handle is limited to 30 degrees.

No.	For U. S. Standard Nuts; Bolt Sizes	Milled Openings Ins.	Length Over All Ins.	Thickness Head Ins.	PRICE EACH		No.
					Unfinished	Semi-finished	
454	5/8	1 1/16	14	5/8	\$0.62	\$0.80	454
455	3/4	1 1/4	16	3/4	.86	1.10	455
456	7/8	1 7/16	17 1/2	13/16	1.18	1.50	456
457	1	1 5/8	19	13/16	1.60	2.10	457

Structural Wrenches

WITH OFFSET



STRAIGHT OPENING

No.	For U. S. Standard Nuts; Bolt Sizes	Milled Openings Ins.	Length Over All Ins.	Thickness Head Ins.	PRICE EACH		No.
					Unfinished	Semi-finished	
478	1/4	17/32	8	11/32	\$0.33	\$0.40	478
479	5/16	5/8	8	11/32	.33	.40	479
480	3/8	23/32	9 1/2	13/32	.40	.52	480
481	7/16	13/16	9 1/2	13/32	.40	.52	481
482	1/2	29/32	11 1/2	15/32	.52	.70	482
483	9/16	1	12 3/4	13/32	.52	.70	483
484	5/8	1 1/8	14 1/8	5/8	.74	.98	484
485	3/4	1 5/16	16	3/4	1.02	1.34	485
486	7/8	1 1/2	17 1/2	13/16	1.40	1.80	486
487	1	1 11/16	19	13/16	1.90	2.50	487

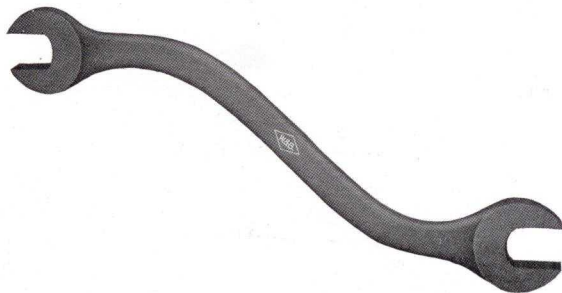
Above Semi-Finished Wrenches case hardened all over, heads not ground. For Weights and Packing see pages 145-150; Special Conditions Regarding Milling, page 103.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

Car Builders Wrenches

DOUBLE HEAD

22½° ANGLE



No.	For U. S. Standard Nuts; Bolt Sizes	Openings Ins.	Length Over All Ins.	Thickness Heads Ins.	Un-finished	Semi-finished	No.
515	3/8 & 1/2	23/32 & 29/32	12	1/2 & 9/16	\$0.55	\$0.75	515
516	1/2 & 5/8	15/16 & 1 1/8	19	9/16 & 9/16	.95	1.25	516
517	1/2 & 3/4	15/16 & 1 5/16	19	9/16 & 9/16	1.15	1.55	517
518	1/2 & 7/8	15/16 & 1 1/2	20	9/16 & 9/16	1.15	1.55	518
519	5/8 & 3/4	1 1/8 & 1 5/16	20	19/32 & 19/32	1.15	1.55	519
520	5/8 & 7/8	1 1/8 & 1 1/2	21	19/32 & 19/32	1.35	1.85	520
521	5/8 & 1	1 1/8 & 1 11/16	21	19/32 & 19/32	1.35	1.85	521
522	3/4 & 7/8	1 5/16 & 1 1/2	21	19/32 & 19/32	1.35	1.85	522
523	3/4 & 1	1 5/16 & 1 11/16	22	5/8 & 5/8	1.65	2.25	523
524	3/4 & 1 1/8	1 5/16 & 1 7/8	22	5/8 & 5/8	1.65	2.25	524
525	7/8 & 1	1 1/2 & 1 11/16	22	5/8 & 5/8	1.65	2.25	525
526	7/8 & 1 1/8	1 1/2 & 1 7/8	23	5/8 & 5/8	1.95	2.65	526
527	7/8 & 1 1/4	1 1/2 & 2 1/16	23	5/8 & 5/8	1.95	2.65	527
528	1 & 1 1/8	1 11/16 & 1 7/8	23	5/8 & 5/8	1.95	2.65	528
529	1 & 1 1/4	1 11/16 & 2 1/16	24	5/8 & 5/8	2.25	3.15	529
530	1 1/8 & 1 1/4	1 7/8 & 2 1/16	24	5/8 & 5/8	2.25	3.15	530
531	1 1/8 & 1 1/2	1 7/8 & 2 7/16	25	5/8 & 3/4	3.40	4.50	531
532	1 1/4 & 1 1/2	2 1/16 & 2 7/16	25	5/8 & 3/4	3.40	4.50	532

Semi-Finished Case Hardened all over, heads not ground.

For Weights and Packing see pages 145-150; Special Conditions Regarding Milling, page 103.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

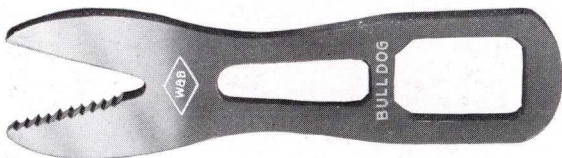


"Bull Dog" Wrenches



No. 0

Pocket size, 4 in. long. Holds pipe $\frac{1}{8}$ to $\frac{1}{4}$ in. Holds round iron $\frac{1}{4}$ to $\frac{9}{16}$ in.
Price, per dozen, \$3.00



No. 1

5 $\frac{1}{4}$ in. long. Holds pipe $\frac{1}{8}$ to $\frac{3}{8}$ in. Holds round iron $\frac{1}{4}$ to $\frac{3}{4}$ in.
Price, per dozen, \$4.00



No. 1 $\frac{1}{2}$

5 $\frac{3}{4}$ in. long. Holds pipe $\frac{1}{8}$ to $\frac{3}{8}$ in. Holds round iron $\frac{3}{8}$ to $\frac{3}{4}$ in.
Price, per dozen, \$4.50



No. 1 $\frac{3}{4}$

7 $\frac{1}{16}$ in. long. Holds pipe $\frac{1}{8}$ to $\frac{3}{4}$ in. Holds round iron $\frac{3}{8}$ to 1 $\frac{1}{8}$ in.
Price, per dozen, \$8.00

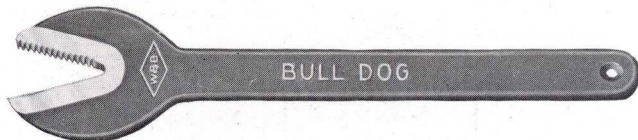
For Weights and Packing see pages 145-150.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

"Bull Dog" Wrenches



No.	Length Over All Ins.	Holds Pipe Diameter Ins.	Holds Round Iron Diameter Ins.	Price Per Dozen	No.
2	9	$\frac{3}{8}$ to $\frac{3}{4}$	$\frac{1}{2}$ to 1	\$12.00	2
2 1/2	12 1/2	$\frac{3}{8}$ to 1	$\frac{5}{8}$ to 1 1/4	18.00	2 1/2



No.	Length Over All Ins.	Holds Pipe Diameter Ins.	Holds Round Iron Diameter Ins.	Price Per Dozen	No.
3	16	$\frac{1}{2}$ to 1 1/4	$\frac{3}{4}$ to 1 3/8	\$24.00	3
3 1/2	18 3/4	$\frac{1}{2}$ to 1 1/2	$\frac{3}{4}$ to 1 3/4	30.00	3 1/2
4	22	1 1/4 to 2	1 1/2 to 2 1/2	36.00	4
4 1/2	24	1 1/4 to 2 1/2	1 5/8 to 3	50.00	4 1/2
5	27	2 to 3	2 1/4 to 3 1/2	60.00	5

Twin Wrenches



No.	Length Over All Ins.	Holds Pipe Diameter Ins.	Holds Round Iron Diameter Ins.	Price Per Dozen	No.
Twin.	10	$\frac{1}{8}$ to $\frac{3}{4}$	$\frac{1}{4}$ to 1	\$18.00	Twin.

Packed: one-half dozen in paper box.

Drop-forged from high carbon steel of special analysis.

For Weights and Packing see pages 145-150.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

**"Always Ready" Wrenches**

POLISHED AND NICKEL PLATED



No.	Length Over All Ins.	Holds Square or Round Iron, Diameter, Ins.	Price Per Dozen	Weight Per Dozen	No.
1	5	$\frac{1}{4}$ to $\frac{3}{4}$	\$ 5.00	lbs. 5 oz. 3	1
2	7	$\frac{1}{4}$ to $1\frac{1}{4}$	6.75	10 5	2
2 $\frac{1}{2}$	9 $\frac{1}{2}$	$\frac{1}{4}$ to $1\frac{3}{4}$	10.50	26 4	2 $\frac{1}{2}$
3	11 $\frac{1}{2}$	$\frac{3}{4}$ to 2	16.00	29 10	3

Forged from High Carbon Steel, of special analysis, and tempered in oil.

Packed: Nos. 1, 2, 2 $\frac{1}{2}$ Envelopes one-half dozen in paper box; No. 3 Envelopes in bulk.**"Always Ready" Wrenches**

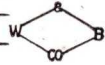
BLACK FINISH—POLISHED JAWS



No.	Length Over All Ins.	Holds Square or Round Iron, Diameter, Ins.	Price Per Dozen	Weights Per Dozen	No.
1	5	$\frac{1}{4}$ to $\frac{3}{4}$	\$ 4.60	lbs. 5 oz. 8	1
2	7	$\frac{1}{4}$ to $1\frac{1}{4}$	6.30	9 11	2
2 $\frac{1}{2}$	9 $\frac{1}{2}$	$\frac{1}{4}$ to $1\frac{3}{4}$	10.00	20 5	2 $\frac{1}{2}$
3	11 $\frac{1}{2}$	$\frac{3}{4}$ to 2	15.25	28 2	3

Packed: Nos. 1, 2, 2 $\frac{1}{2}$ Envelopes one-half dozen in paper box; No. 3 Envelopes in bulk.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



Spark Plug Wrench



This handy tool is designed to easily reach the Spark Plug of Automobile, Motor Boat and Gas Engines. The difficulties in adjusting the ordinary wrench to the plug have been overcome.

It is made of drop-forged steel and is the most convenient wrench yet designed for the purpose.

BOX END

$\frac{7}{8}$ in. opening, for $\frac{1}{2}$ -inch Spark Plug.

OPEN END

For Tire Lug

$\frac{3}{8}$ -in. U. S. Std. Cap Screw

$\frac{3}{8}$ -in. A. L. A. M. Std. Nut

$\frac{3}{8}$ -in. A. L. A. M. Std. Cap Screw

$\frac{9}{16}$ -in. Set Screw

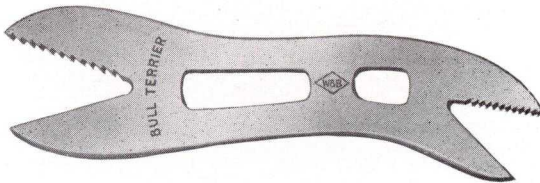
List price, unfinished..... each \$0.40

List price, semi-finished..... each .58

List price, finished..... each .85

Packed: Unfinished and Semi-finished, in bulk. Finished, envelopes in bulk.

"Bull Terrier" Wrenches



Small End holds Pipe $\frac{1}{8}$ to $\frac{1}{4}$ inch, Round Iron $\frac{1}{4}$ to $\frac{9}{16}$ inch; Large End holds Pipe $\frac{1}{8}$ to $\frac{3}{8}$ inch, Round Iron $\frac{1}{4}$ to $\frac{3}{4}$ inch. Jaws are oil tempered and entire Wrench nicely polished and lacquered.

Price, per dozen..... \$6.50

Packed: Envelopes 6 in box, weight per doz., 3 lbs. 12 oz.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

**"Railroad Special" Wrenches**

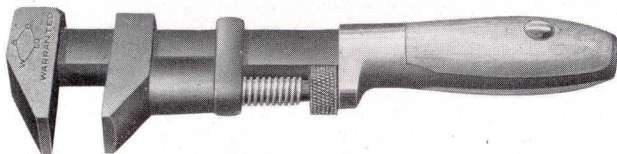
List Effective April 5, 1916

This is the strongest and best HEAVY DUTY wrench made. Head and Bar Drop-Forged in one piece from selected steel. Extra heavy jaws thoroughly case-hardened. Indestructible iron handle. FITTED WITH "W. & B." EASY ACTING SCREW. Every wrench guaranteed against defective material and workmanship.

Size Ins.	Price Per Dozen	Jaws Open Ins.	Number in Case	Net and Gross Weight Per Case Lbs.	Measurement of Case Ins.	Size Ins.
6	\$10.00	1	72	61-70	16 x 9½ x 8½	6
8	12.00	1½	72	109-131	18¼ x 10¾ x 10½	8
10	14.00	1⅞	72	177-205	32¼ x 12¾ x 9½	10
12	18.00	2¼	72	235-270	36¼ x 15 x 9½	12
15	24.00	2⅜	48	251-290	31¼ x 18 x 10¼	15
18	32.00	3	24	181-205	22 x 15 x 13½	18
21	39.00	3⅝	12	127-150	25 x 13¼ x 8½	21

Each wrench wrapped in Anti-rust paper.

*The name "Railroad Special" applied to Wrenches, is our Registered Trade Mark.

"W. & B." Machinist's Knife Handle Wrenches

List Effective April 5, 1916

This is the best wrench of its type on the market. With the exception of the difference in the handle it is practically the same as the "Railroad Special" Wrench. FITTED WITH "W. & B." EASY ACTING SCREW.

Every wrench guaranteed against defective material and workmanship.

Size Ins.	Price Per Dozen	Jaws Open Ins.	Number in Case	Net and Gross Weight Per Case Lbs.	Measurement of Case Ins.	Size Ins.
6	\$10.00	1	72	60 - 75	25 x 9 x 8½	6
8	12.00	1½	72	108 -130	29¼ x 11 x 9	8
10	14.00	1⅞	72	185 -210	34 x 13 x 10¼	10
12	18.00	2¼	72	231 -260	35¾ x 14¾ x 10¾	12
15	24.00	2⅜	48	237 -265	29¼ x 18 x 12¼	15
18	32.00	3	24	180 -205	22¾ x 15½ x 14	18
21	39.00	3⅝	12	125½-150	25 x 15½ x 8½	21

Each wrench wrapped in Anti-rust paper.

ALWAYS GIVE LIST NUMBER WHEN ORDERING

"W. & B." Regular Wrenches



List Effective April 5, 1916

Head and Bar Drop Forged in one piece. FITTED WITH "W. & B." EASY ACTING SCREW and thoroughly seasoned handle.

Size Ins.	Price Per Dozen	Jaws Open Ins.	Number In Case	Net and Gross Weight Per Case Lbs.	Measurement of Case Ins.	Size Ins.
6	\$10.00	$2\frac{3}{32}$	72	54 $\frac{1}{2}$ & 64 $\frac{1}{2}$	14 $\frac{1}{4}$ x 9 x 9	6
8	12.00	1 $\frac{5}{16}$	72	93 $\frac{3}{4}$ & 108 $\frac{3}{4}$	16 $\frac{1}{2}$ x 10 $\frac{1}{2}$ x 10	8
10	14.00	1 $\frac{11}{16}$	72	131 $\frac{1}{2}$ & 152	25 $\frac{1}{2}$ x 12 x 7 $\frac{3}{4}$	10
12	18.00	1 $\frac{7}{8}$	72	167 & 182 $\frac{1}{2}$	26 $\frac{5}{8}$ x 14 x 8 $\frac{1}{4}$	12
15	24.00	2 $\frac{7}{16}$	48	154 $\frac{1}{2}$ & 176 $\frac{1}{4}$	20 $\frac{1}{2}$ x 17 $\frac{1}{4}$ x 9	15

Each wrench wrapped in Manila paper.

"W. & B." Combination Wrenches



BRIGHT FINISH

This Wrench combines all desirable features of both pipe and nut wrenches. Head and bar forged in one piece.

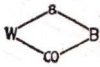
It is adapted to a wide range of work.

Size Ins.	Price Per Dozen	Jaws Open Ins.	Number In Case	Net and Gross Weight Per Case Lbs.	Measurement of Case Ins.	Size Ins.
10	\$23.00	$2\frac{3}{8}$	72	164-190	32 x 12 x 9	10
12	26.00	$2\frac{3}{4}$	72	240-275	35 x 14 x 10	12
15	37.00	$3\frac{1}{4}$	48	252-295	29 x 18 x 12	15
18	66.00	4 $\frac{1}{2}$	24	180-220	38 $\frac{1}{4}$ x 21 x 8 $\frac{1}{4}$	18

Size Ins.	ADJUSTMENT LIMITS	Size Ins.
10	Wire or pipe from $\frac{1}{4}$ to 1 inch, outside diameter	10
12	Wire or pipe from $\frac{1}{2}$ to $1\frac{3}{4}$ inch, outside diameter	12
15	Wire or pipe from $\frac{1}{2}$ to $2\frac{1}{4}$ inch, outside diameter	15
18	Wire or pipe from $\frac{1}{2}$ to 3 inch, outside diameter	18

Each Wrench wrapped in Anti-rust paper. Packed $\frac{1}{2}$ dozen in a box.

ALWAYS GIVE LIST NUMBER WHEN ORDERING



“W. & B.” Auto Wrench



A strong Wrench, with head and bar drop forged in one piece from Open Hearth Steel.

Adapted for automobile and other work where a wrench with thin jaws is required. Thickness of head $\frac{5}{8}$ inch.

Iron handle. FITTED WITH “W. & B.” EASY ACTING SCREW.

Made in 10-inch size. Jaws open $1\frac{1}{2}$ inches.

Each wrench wrapped in Anti-rust paper and packed in wooden box.

Price, per dozen \$15.00

“W. & B.” Intermediate Wrenches



List Effective April 5, 1916

Head and Bar Drop Forged in one piece. Jaws case hardened, iron handle. FITTED WITH “W. & B.” EASY ACTING SCREW.

Size Ins.	Price Per Dozen	Jaws Open Ins.	Number in Case	Net and Gross Weight Per Case Lbs.	Measurement of Case Ins.	Size Ins.
6	\$10.00	1	72	57- 67	$14\frac{1}{4} \times 9 \times 9$	6
8	12.00	$1\frac{5}{16}$	72	96-110	$16\frac{1}{2} \times 10\frac{1}{2} \times 10$	8
10	14.00	$1\frac{11}{16}$	72	160-180	$25\frac{1}{2} \times 12 \times 7\frac{3}{4}$	10
12	18.00	$2\frac{1}{16}$	72	232-256	$26\frac{5}{8} \times 14 \times 8\frac{1}{4}$	12
15	24.00	$2\frac{5}{8}$	48	230-253	$20\frac{1}{2} \times 17\frac{1}{4} \times 9$	15
18	32.00	3	24	180-196	$21 \times 13 \times 9\frac{1}{2}$	18
21	39.00	$3\frac{1}{16}$	12	112-132	$25\frac{1}{2} \times 12 \times 7\frac{3}{4}$	21

ALWAYS GIVE LIST NUMBER WHEN ORDERING

DROP FORGINGS

Put Your Forging Troubles Up To Us

THE forging department of our factories at Chicago, Ill., and St. Catharines, Ont., are developed to the limit of proficiency in capacity and the skill of our employees.

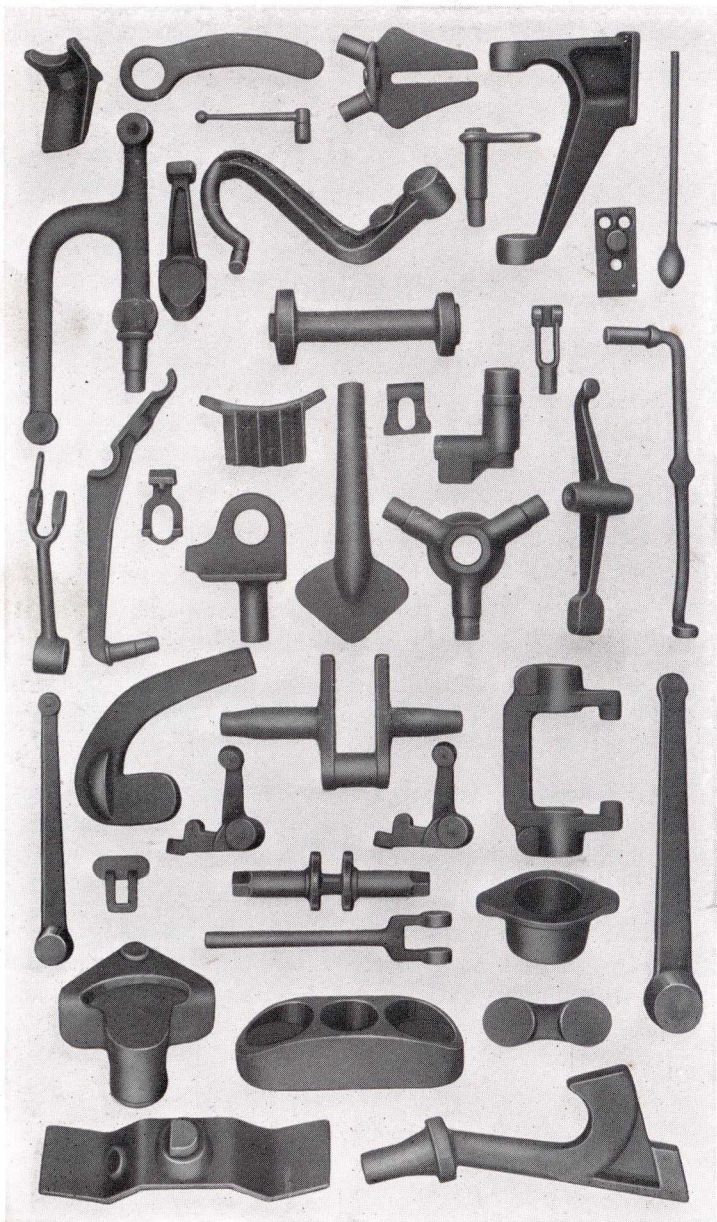
Particularly are we equipped for the manufacture of Special Forgings subject to customers' samples or blueprints.

"W. & B." Forgings are as accurate and uniform as it is possible for skilled men and superior equipment to make them.

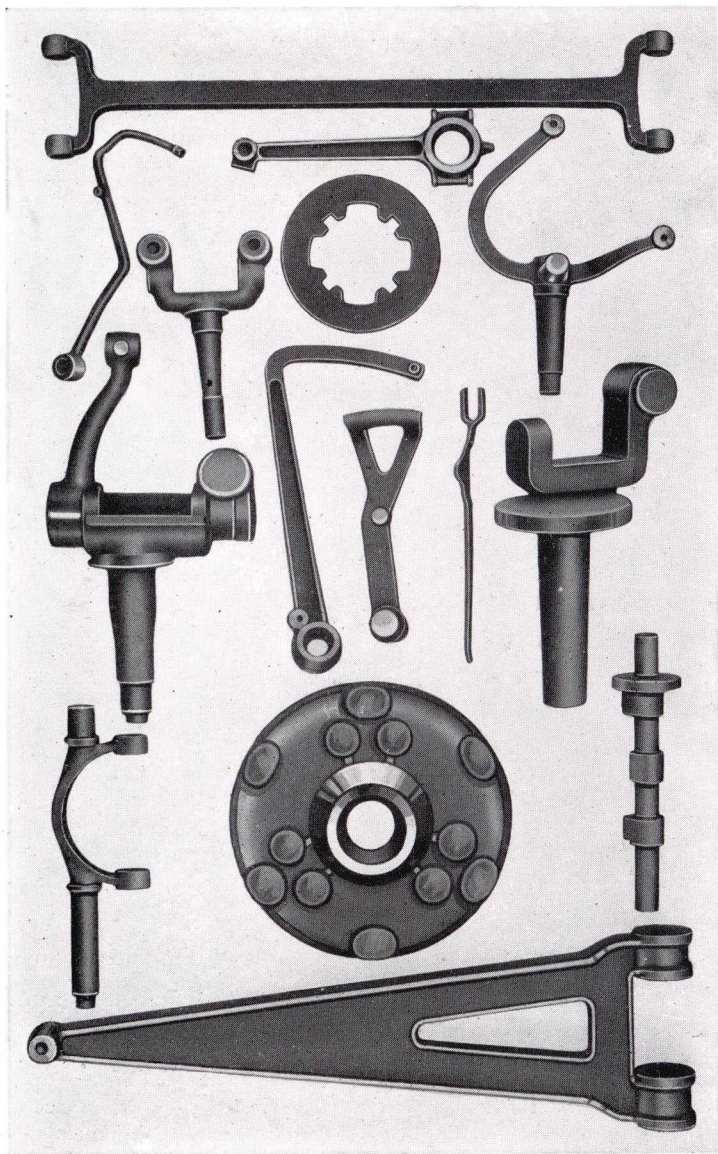
We carry on hand at all times complete stocks of Carbon and Alloy Forging steel of assorted sizes. This is an important consideration in the making of prompt deliveries.

The evidences of our experience and facilities in the manufacture of Special Forgings are shown by the illustrations on the following pages.

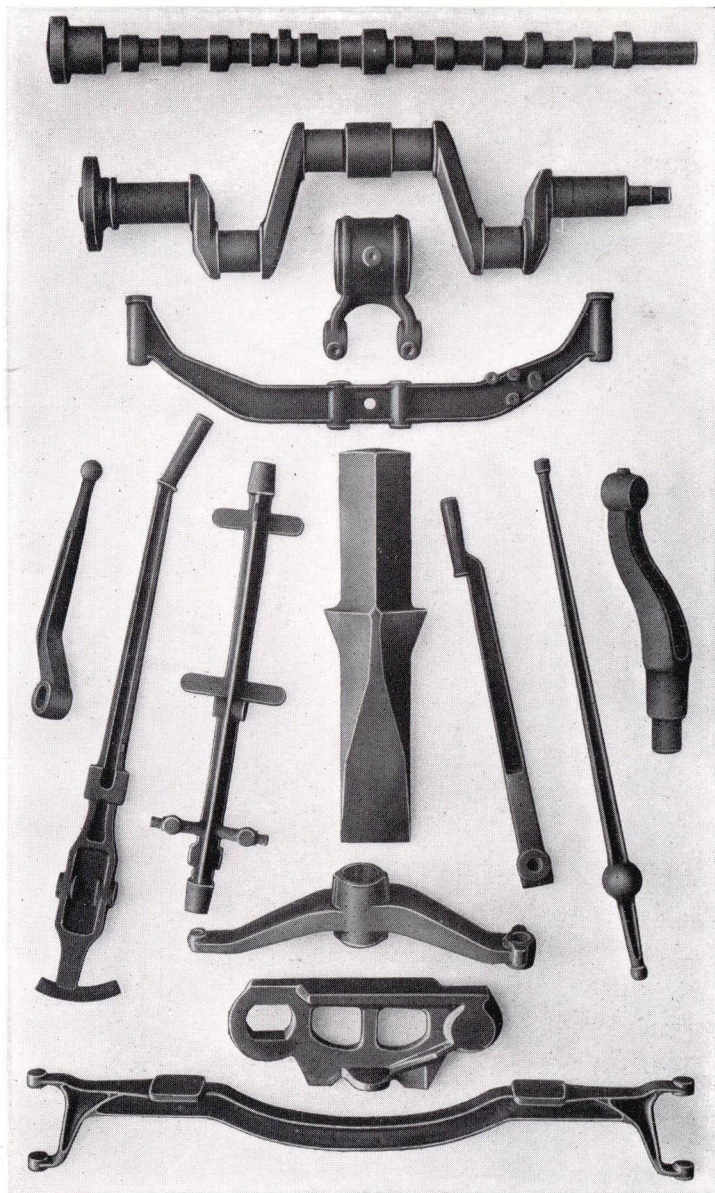
We would appreciate the opportunity of estimating and consulting with you regarding your requirements. Inquiries in the United States will receive prompt attention by addressing us at 1000 W. 120th Street, Chicago, Ill., and in Canada at St. Catharines, Ont.



Our Special Drop Forgings are made only subject to customers' samples or blue prints.



Our Special Drop Forgings are made only subject to customers' samples or blue prints.



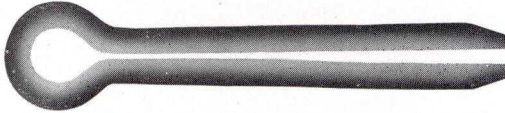
Our Special Drop Forgings are made only subject to customers' samples or blue prints.



Spring Cotters

All Measurements made Under the Eye

List in effect July 21, 1911. Superseding all previous lists.



Our Spring Cotters will run at least 10 per cent better than any others on account of superior heading and pointing. We have the largest output of any factory in the world.

Wire Gauge Size	Size	Price Per 1000	Quantity in Package	Approximate Weight Per 1000		Wire Gauge Size	Size	Price Per 1000	Quantity in Package	Approximate Weight Per 1000			
				lbs.	oz.					lbs.	oz.		
No. 16	$\frac{1}{16} \times \frac{5}{16}$	\$3.50	1,000		9	No. 13	$\frac{3}{32} \times \frac{7}{8}$	\$4.80	1,000	2	3		
	$\frac{1}{16} \times \frac{7}{8}$	3.50	1,000		11		$\frac{3}{32} \times 1$	4.80	1,000	2	5		
	$\frac{1}{16} \times \frac{7}{16}$	3.50	1,000		12		$\frac{3}{32} \times 1 \frac{1}{4}$	5.45	1,000	2	12		
	$\frac{1}{16} \times \frac{1}{2}$	3.50	1,000		13		$\frac{3}{32} \times 1 \frac{1}{2}$	6.10	1,000	3	9		
	$\frac{1}{16} \times \frac{5}{8}$	4.15	1,000		14		$\frac{3}{32} \times 1 \frac{3}{4}$	6.75	1,000	4	1		
	$\frac{1}{16} \times \frac{3}{4}$	4.15	1,000		15		$\frac{3}{32} \times 2$	7.40	1,000	4	10		
	$\frac{1}{16} \times \frac{1}{8}$	4.80	1,000	1	1		No. 12	$\frac{7}{64} \times \frac{1}{2}$	4.00	1,000	2	1	
	$\frac{1}{16} \times 1$	4.80	1,000	1	2			$\frac{7}{64} \times \frac{3}{4}$	4.75	1,000	2	12	
	$\frac{1}{16} \times 1 \frac{1}{4}$	5.45	1,000	1	4			$\frac{7}{64} \times 1$	5.50	1,000	3	5	
	$\frac{1}{16} \times 1 \frac{1}{4}$	5.45	1,000	1	5			$\frac{7}{64} \times 1 \frac{1}{4}$	6.25	1,000	4	0	
	$\frac{1}{16} \times 1 \frac{1}{2}$	6.10	1,000	1	6			$\frac{7}{64} \times 1 \frac{1}{2}$	7.00	1,000	4	12	
	$\frac{1}{16} \times 1 \frac{1}{2}$	6.10	1,000	1	9			$\frac{7}{64} \times 1 \frac{3}{4}$	7.75	1,000	5	1	
	$\frac{1}{16} \times 1 \frac{3}{4}$	6.75	1,000	1	11			$\frac{7}{64} \times 2$	8.50	1,000	6	2	
	$\frac{1}{16} \times 1 \frac{3}{4}$	6.75	1,000	2	0			No. 11	$\frac{1}{8} \times \frac{1}{2}$	5.00	1,000	2	12
	$\frac{1}{16} \times 2$	7.40	1,000	2	5				$\frac{1}{8} \times \frac{3}{4}$	5.85	1,000	3	10
$\frac{1}{16} \times 2 \frac{1}{4}$	8.05	1,000	2	10	$\frac{1}{8} \times 1$	6.70			1,000	4	0		
$\frac{1}{16} \times 2 \frac{1}{2}$	8.70	1,000	2	13	$\frac{1}{8} \times 1 \frac{1}{4}$	7.55			1,000	4	14		
$\frac{1}{16} \times 2 \frac{3}{4}$	9.35	500	3	6	$\frac{1}{8} \times 1 \frac{1}{2}$	8.40			1,000	5	9		
$\frac{1}{16} \times 3$	10.00	500	3	8	$\frac{1}{8} \times 1 \frac{3}{4}$	9.25			1,000	6	0		
$\frac{1}{16} \times 3 \frac{1}{4}$	10.65	500	3	9 $\frac{1}{2}$	$\frac{1}{8} \times 2$	10.10			1,000	7	3		
$\frac{1}{16} \times 3 \frac{1}{2}$	11.30	500	3	11	$\frac{1}{8} \times 2 \frac{1}{4}$	10.95			500	9	0		
No. 14 1/2	$\frac{3}{64} \times \frac{5}{16}$	3.50	1,000		13	$\frac{1}{8} \times 2 \frac{1}{2}$	11.80		500	9	12		
	$\frac{3}{64} \times \frac{7}{8}$	3.50	1,000		14	No. 10	$\frac{5}{64} \times \frac{3}{4}$		7.00	1,000	4	10	
	$\frac{3}{64} \times \frac{1}{8}$	3.50	1,000	1	0		$\frac{5}{64} \times 1$		8.00	1,000	5	10	
	$\frac{3}{64} \times \frac{1}{2}$	3.50	1,000	1	0		$\frac{5}{64} \times 1 \frac{1}{4}$		9.00	1,000	6	4	
	$\frac{3}{64} \times \frac{5}{8}$	4.15	1,000	1	2		$\frac{5}{64} \times 1 \frac{1}{2}$		10.00	1,000	6	12	
	$\frac{3}{64} \times \frac{3}{4}$	4.15	1,000	1	3		$\frac{5}{64} \times 1 \frac{3}{4}$		11.00	1,000	8	10	
	$\frac{3}{64} \times \frac{1}{8}$	4.15	1,000	1	5		$\frac{5}{64} \times 2$		12.00	500	10	0	
	$\frac{3}{64} \times 1$	4.80	1,000	1	9		$\frac{5}{64} \times 2 \frac{1}{4}$	13.00	500	10	10		
	$\frac{3}{64} \times 1 \frac{1}{4}$	4.80	1,000	1	11		$\frac{5}{64} \times 2 \frac{1}{2}$	14.00	500	12	0		
	$\frac{3}{64} \times 1 \frac{1}{2}$	5.45	1,000	2	2		No. 9	$\frac{5}{32} \times \frac{1}{2}$	7.00	1,000	4	6	
	$\frac{3}{64} \times 1 \frac{1}{2}$	6.10	1,000	2	8			$\frac{5}{32} \times \frac{3}{4}$	8.15	1,000	5	10	
	$\frac{3}{64} \times 1 \frac{3}{4}$	6.75	1,000	2	14			$\frac{5}{32} \times 1$	9.30	1,000	7	0	
	$\frac{3}{64} \times 2$	7.40	1,000	3	4			$\frac{5}{32} \times 1 \frac{1}{4}$	10.45	1,000	8	5	
	$\frac{3}{64} \times 2 \frac{1}{4}$	8.05	1,000	3	10			$\frac{5}{32} \times 1 \frac{1}{2}$	11.60	1,000	9	5	
	$\frac{3}{64} \times 2 \frac{1}{2}$	8.70	1,000	4	0			$\frac{5}{32} \times 1 \frac{3}{4}$	12.75	1,000	9	13	
$\frac{3}{64} \times 3$	10.00	1,000	4	8	$\frac{5}{32} \times 2$			13.90	500	10	14		
No. 13	$\frac{3}{32} \times \frac{1}{2}$	3.50	1,000	1	7	$\frac{5}{32} \times 2 \frac{1}{4}$		15.05	500	13	8		
	$\frac{3}{32} \times \frac{5}{8}$	4.15	1,000	1	10	$\frac{5}{32} \times 2 \frac{1}{2}$		16.20	500	14	0		
	$\frac{3}{32} \times \frac{3}{4}$	4.15	1,000	2	0								

List and discount apply to Standard packages only. When ordered in packages other than regular, subject to extra charge for packing and boxes at cost. List on Brass Cotters eight times the list of Steel.

Continued on next page.

Spring Cotters—Continued

Wire Gauge Size	Size	Price Per 1000	Quantity in Package	Approximate Weight Per 1000		Wire Gauge Size	Size	Price Per 1000	Quantity in Package	Approximate Weight Per 1000	
				lb.	oz.					lb.	oz.
No. 8	$\frac{11}{16} \times 1$	\$10.60	1,000	8	1	No. 1	$\frac{5}{16} \times 1$	\$32.50	500	29	8
	$\frac{11}{16} \times 1\frac{1}{4}$	11.90	1,000	9	7		$\frac{5}{16} \times 1\frac{1}{4}$	37.50	250	34	1
	$\frac{11}{16} \times 1\frac{1}{2}$	13.20	1,000	11	1		$\frac{5}{16} \times 1\frac{1}{2}$	42.50	250	38	0
	$\frac{11}{16} \times 1\frac{3}{4}$	14.50	1,000	12	3		$\frac{5}{16} \times 1\frac{3}{4}$	47.50	250	44	0
	$\frac{11}{16} \times 2$	15.80	500	14	0		$\frac{5}{16} \times 2$	52.50	250	47	13
	$\frac{11}{16} \times 2\frac{1}{4}$	17.10	500	15	6		$\frac{5}{16} \times 2\frac{1}{4}$	57.50	250	52	6
No. 7	$\frac{11}{16} \times 2\frac{1}{2}$	18.40	500	16	12	$\frac{5}{16} \times 2\frac{1}{2}$	62.50	250	57	10	
	$\frac{1}{2} \times 3\frac{1}{4}$	11.10	1,000	8	0	$\frac{5}{16} \times 2\frac{3}{4}$	67.50	250	61	9	
	$\frac{1}{2} \times 1$	12.80	1,000	9	5	$\frac{1}{2} \times 3$	72.50	200	67	0	
	$\frac{1}{2} \times 1\frac{1}{4}$	14.50	1,000	10	10	$\frac{1}{2} \times 3\frac{1}{4}$	77.50	200	70	11	
	$\frac{1}{2} \times 1\frac{1}{2}$	16.20	1,000	13	8	$\frac{1}{2} \times 3\frac{1}{2}$	82.50	150	75	5	
	$\frac{1}{2} \times 1\frac{3}{4}$	17.90	500	14	4	$\frac{1}{2} \times 3\frac{3}{4}$	87.50	150	79	14	
	$\frac{1}{2} \times 2$	19.60	500	16	8	$\frac{1}{2} \times 4$	92.50	100	84	7	
	$\frac{1}{2} \times 2\frac{1}{4}$	21.30	500	17	10	$\frac{3}{8} \times 1\frac{1}{2}$	72.00	Bulk	60		
	$\frac{1}{2} \times 2\frac{1}{2}$	23.00	500	20	0	$\frac{3}{8} \times 1\frac{3}{4}$	79.20	"	66		
	$\frac{1}{2} \times 2\frac{3}{4}$	24.70	500	21	2	$\frac{3}{8} \times 2$	86.40	"	70		
No. 6	$\frac{1}{2} \times 3$	26.40	250	22	14	$\frac{3}{8} \times 2\frac{1}{4}$	93.60	"	78		
	$\frac{13}{16} \times 1$	14.00	1,000	12	0	$\frac{3}{8} \times 2\frac{1}{2}$	100.80	"	84		
	$\frac{13}{16} \times 1\frac{1}{4}$	16.00	1,000	12	14	$\frac{3}{8} \times 2\frac{3}{4}$	108.00	"	91		
	$\frac{13}{16} \times 1\frac{1}{2}$	18.00	1,000	15	10	$\frac{3}{8} \times 3$	115.20	"	95		
	$\frac{13}{16} \times 1\frac{3}{4}$	20.00	500	20	0	$\frac{3}{8} \times 3\frac{1}{4}$	122.40	"	103		
	$\frac{13}{16} \times 2$	22.00	500	20	8	$\frac{3}{8} \times 3\frac{1}{2}$	129.60	"	109		
	$\frac{13}{16} \times 2\frac{1}{4}$	24.00	500	22	10	$\frac{3}{8} \times 3\frac{3}{4}$	136.80	"	116		
	$\frac{13}{16} \times 2\frac{1}{2}$	26.00	500	24	11	$\frac{3}{8} \times 4$	144.00	"	123		
	$\frac{13}{16} \times 2\frac{3}{4}$	28.00	250	26	13	$\frac{7}{16} \times 1\frac{3}{4}$	108.00	"	108		
	$\frac{13}{16} \times 3$	30.00	250	28	14	$\frac{7}{16} \times 2$	119.50	"	118		
No. 5	$\frac{7}{16} \times 1$	18.00	500	15	7	$\frac{7}{16} \times 2\frac{1}{4}$	131.00	"	128		
	$\frac{7}{16} \times 1\frac{1}{4}$	20.80	500	17	14	$\frac{7}{16} \times 2\frac{1}{2}$	142.50	"	138		
	$\frac{7}{16} \times 1\frac{1}{2}$	23.60	500	20	5	$\frac{7}{16} \times 2\frac{3}{4}$	154.00	"	148		
	$\frac{7}{16} \times 1\frac{3}{4}$	26.40	500	20	14	$\frac{7}{16} \times 3$	165.50	"	159		
	$\frac{7}{16} \times 2$	29.20	250	25	3	$\frac{7}{16} \times 3\frac{1}{4}$	177.00	"	169		
	$\frac{7}{16} \times 2\frac{1}{4}$	32.00	250	27	10	$\frac{7}{16} \times 3\frac{1}{2}$	188.50	"	180		
	$\frac{7}{16} \times 2\frac{1}{2}$	34.80	250	30	1	$\frac{7}{16} \times 3\frac{3}{4}$	200.00	"	189		
	$\frac{7}{16} \times 2\frac{3}{4}$	37.60	250	32	8	$\frac{7}{16} \times 4$	211.50	"	198		
	$\frac{7}{16} \times 3$	40.40	250	34	15	$\frac{7}{16} \times 5$	257.50	"	239		
	No. 4	$\frac{1}{2} \times 2$	148.50				$\frac{1}{2} \times 2\frac{1}{4}$	148.50	"	150	
$\frac{1}{2} \times 2\frac{1}{4}$		163.50				$\frac{1}{2} \times 2\frac{1}{2}$	163.50	"	161		
$\frac{1}{2} \times 2\frac{1}{2}$		178.50				$\frac{1}{2} \times 2\frac{3}{4}$	178.50	"	175		
$\frac{1}{2} \times 2\frac{3}{4}$		193.50				$\frac{1}{2} \times 3$	193.50	"	189		
$\frac{1}{2} \times 3$		208.50				$\frac{1}{2} \times 3\frac{1}{4}$	208.50	"	200		
$\frac{1}{2} \times 3\frac{1}{4}$		223.50				$\frac{1}{2} \times 3\frac{1}{2}$	223.50	"	213		
$\frac{1}{2} \times 3\frac{1}{2}$		238.50				$\frac{1}{2} \times 3\frac{3}{4}$	238.50	"	225		
$\frac{1}{2} \times 3\frac{3}{4}$		253.50				$\frac{1}{2} \times 4$	253.50	"	238		
$\frac{1}{2} \times 4$		268.50				$\frac{1}{2} \times 5$	268.50	"	250		
$\frac{1}{2} \times 5$		328.50				$\frac{5}{8} \times 2$	328.50	"	300		
$\frac{1}{2} \times 6$		388.50				$\frac{5}{8} \times 2\frac{1}{4}$	388.50	"	350		
$\frac{5}{8} \times 3$		384.00				$\frac{5}{8} \times 2\frac{1}{2}$	384.00	"	300		
$\frac{5}{8} \times 3\frac{1}{4}$		404.00				$\frac{5}{8} \times 2\frac{3}{4}$	404.00	"	349		
$\frac{5}{8} \times 3\frac{1}{2}$		424.00				$\frac{5}{8} \times 3$	424.00	"	369		
$\frac{5}{8} \times 3\frac{3}{4}$	444.00				$\frac{5}{8} \times 3\frac{1}{4}$	444.00	"	388			
$\frac{5}{8} \times 4$	464.00				$\frac{5}{8} \times 3\frac{1}{2}$	464.00	"	455			
$\frac{5}{8} \times 5$	544.00				$\frac{5}{8} \times 3\frac{3}{4}$	544.00	"	487			
$\frac{5}{8} \times 6$	644.00				$\frac{5}{8} \times 4$	644.00	"	566			

List and discount apply to Standard packages only. When ordered in packages other than regular, subject to extra charge for packing and boxes at cost. List on Brass Cotters eight times the list of steel.



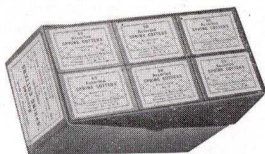
Cellar Box Cotters

List in effect July 21, 1911. Superseding all previous lists.

Size Inches	Price Per 1000	Quantity in Package	Approx. Weight Per 1000	Size Inches	Price Per 1000	Quantity in Package	Approx. Weight Per 1000
$\frac{3}{8} \times 7$	\$412.00	Bulk	199 lbs.	$\frac{9}{16} \times 9$	\$1044.00	Bulk	616 lbs.
$\frac{3}{8} \times 8$	454.00	"	225	$\frac{9}{16} \times 10$	1140.00	"	677
$\frac{3}{8} \times 9$	496.00	"	250	$\frac{9}{16} \times 11$	1236.00	"	738
$\frac{3}{8} \times 10$	538.00	"	275	$\frac{9}{16} \times 12$	1332.00	"	799
$\frac{3}{8} \times 11$	580.00	"	301	$\frac{9}{16} \times 13$	1428.00	"	860
$\frac{3}{8} \times 12$	622.00	"	326	$\frac{9}{16} \times 14$	1524.00	"	921
$\frac{3}{8} \times 13$	664.00	"	351	$\frac{9}{16} \times 15$	1620.00	"	981
$\frac{3}{8} \times 14$	706.00	"	376	$\frac{9}{16} \times 16$	1716.00	"	1042
$\frac{3}{8} \times 15$	748.00	"	402	$\frac{9}{16} \times 17$	1812.00	"	1103
$\frac{3}{8} \times 16$	790.00	"	427	$\frac{9}{16} \times 18$	1908.00	"	1164
$\frac{3}{8} \times 17$	832.00	"	452	$\frac{5}{8} \times 7$	960.00	"	643
$\frac{3}{8} \times 18$	876.00	"	478	$\frac{5}{8} \times 8$	1080.00	"	722
				$\frac{5}{8} \times 9$	1200.00	"	800
$\frac{7}{16} \times 7$	628.00	"	319	$\frac{5}{8} \times 10$	1320.00	"	878
$\frac{7}{16} \times 8$	689.00	"	359	$\frac{5}{8} \times 11$	1440.00	"	957
$\frac{7}{16} \times 9$	750.00	"	399	$\frac{5}{8} \times 12$	1560.00	"	1035
$\frac{7}{16} \times 10$	811.00	"	439	$\frac{5}{8} \times 13$	1680.00	"	1113
$\frac{7}{16} \times 11$	872.00	"	480	$\frac{5}{8} \times 14$	1800.00	"	1192
$\frac{7}{16} \times 12$	933.00	"	520	$\frac{5}{8} \times 15$	1920.00	"	1270
$\frac{7}{16} \times 13$	994.00	"	560	$\frac{5}{8} \times 16$	2040.00	"	1348
$\frac{7}{16} \times 14$	1055.00	"	600	$\frac{5}{8} \times 17$	2160.00	"	1427
$\frac{7}{16} \times 15$	1116.00	"	640	$\frac{5}{8} \times 18$	2280.00	"	1505
$\frac{7}{16} \times 16$	1177.00	"	680	$\frac{3}{4} \times 2$	732.00	"	380
$\frac{7}{16} \times 17$	1238.00	"	721	$\frac{3}{4} \times 2 \frac{1}{4}$	774.00	"	395
$\frac{7}{16} \times 18$	1299.00	"	761	$\frac{3}{4} \times 2 \frac{1}{2}$	816.00	"	425
				$\frac{3}{4} \times 2 \frac{3}{4}$	858.00	"	450
$\frac{1}{2} \times 7$	796.00	"	400	$\frac{3}{4} \times 3$	900.00	"	481
$\frac{1}{2} \times 8$	877.00	"	450	$\frac{3}{4} \times 4$	1068.00	"	590
$\frac{1}{2} \times 9$	958.00	"	500	$\frac{3}{4} \times 5$	1236.00	"	699
$\frac{1}{2} \times 10$	1039.00	"	550	$\frac{3}{4} \times 6$	1404.00	"	808
$\frac{1}{2} \times 11$	1120.00	"	600	$\frac{3}{4} \times 7$	1572.00	"	918
$\frac{1}{2} \times 12$	1201.00	"	650	$\frac{3}{4} \times 8$	1740.00	"	1027
$\frac{1}{2} \times 13$	1282.00	"	700	$\frac{3}{4} \times 9$	1908.00	"	1136
$\frac{1}{2} \times 14$	1363.00	"	750	$\frac{3}{4} \times 10$	2076.00	"	1245
$\frac{1}{2} \times 15$	1444.00	"	800	$\frac{3}{4} \times 11$	2244.00	"	1355
$\frac{1}{2} \times 16$	1525.00	"	850	$\frac{3}{4} \times 12$	2412.00	"	1464
$\frac{1}{2} \times 17$	1606.00	"	900	$\frac{3}{4} \times 13$	2580.00	"	1573
$\frac{1}{2} \times 18$	1687.00	"	950	$\frac{3}{4} \times 14$	2748.00	"	1682
				$\frac{3}{4} \times 15$	2916.00	"	1791
$\frac{9}{16} \times 7$	852.00	"	494	$\frac{3}{4} \times 16$	3084.00	"	1900
$\frac{9}{16} \times 8$	948.00	"	555	$\frac{3}{4} \times 17$	3252.00	"	2000
				$\frac{3}{4} \times 18$	3420.00	"	2118

Above Cellar Box Cotters are shipped in bulk, kegs or boxes.

Assorted Spring Cotters



For the convenience of the trade, we pack Spring Cotters in several special assortments, as shown below.

Assortments Nos. 1, 2 and 3 are especially adapted for Agricultural Trade, and Assortment No. 4 for Automobile Trade.

ASSORTMENT No. 1

Contains 100 Cotters, assorted as follows:

10 $\frac{3}{32} \times \frac{3}{4}$	10 $\frac{3}{16} \times 1\frac{1}{2}$
10 $\frac{3}{32} \times 1$	10 $\frac{1}{4} \times 1\frac{3}{4}$
10 $\frac{1}{8} \times 1$	10 $\frac{1}{4} \times 2$
10 $\frac{1}{8} \times 1\frac{1}{4}$	10 $\frac{5}{16} \times 2$
10 $\frac{1}{16} \times 1\frac{1}{4}$	10 $\frac{1}{16} \times 2\frac{1}{2}$

Packed in a neat pasteboard box, twelve boxes in a carton.

No. 1 Price per box (100 Cotters) \$4.00

No. 1A. Price per carton (12 boxes) \$52.00

Weight per dozen boxes 27 lbs.

ASSORTMENT No. 2

Contains 50 Cotters, assorted as follows:

5 $\frac{3}{32} \times \frac{3}{4}$	5 $\frac{3}{16} \times 1\frac{1}{2}$
5 $\frac{3}{32} \times 1$	5 $\frac{1}{4} \times 1\frac{3}{4}$
5 $\frac{1}{8} \times 1$	5 $\frac{1}{4} \times 2$
5 $\frac{1}{8} \times 1\frac{1}{4}$	5 $\frac{5}{16} \times 2$
5 $\frac{1}{16} \times 1\frac{1}{4}$	5 $\frac{1}{16} \times 2\frac{1}{2}$

Packed in a neat pasteboard box, twelve boxes in a carton. Price, carton (12 boxes) \$26.00

Weight per dozen boxes 11 lbs.

ASSORTMENT No. 3

Contains 25 Cotters, assorted as follows:

3 $\frac{3}{32} \times \frac{3}{4}$	2 $\frac{3}{16} \times 1\frac{1}{2}$
3 $\frac{3}{32} \times 1$	2 $\frac{1}{4} \times 1\frac{3}{4}$
3 $\frac{1}{8} \times 1$	2 $\frac{1}{4} \times 2$
3 $\frac{1}{8} \times 1\frac{1}{4}$	2 $\frac{5}{16} \times 2$
3 $\frac{1}{16} \times 1\frac{1}{4}$	2 $\frac{1}{16} \times 2\frac{1}{2}$

Packed in a neat pasteboard box, twelve boxes in a carton. Price, carton (12 boxes) \$15.00

Weight per dozen boxes $4\frac{1}{2}$ lbs.

ASSORTMENT No. 5

Contains 100 Cotters, assorted as follows:

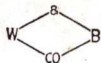
10 $\frac{1}{16} \times \frac{1}{2}$	10 $\frac{3}{32} \times 1$
20 $\frac{1}{16} \times 1\frac{1}{4}$	10 $\frac{3}{32} \times 1\frac{1}{4}$
15 $\frac{3}{32} \times \frac{1}{2}$	15 $\frac{1}{8} \times \frac{3}{4}$
10 $\frac{3}{32} \times \frac{3}{4}$	10 $\frac{1}{8} \times 1$

Packed in round box of heavy pasteboard with metal bottom and screw top.

Weight per 100 boxes $27\frac{1}{2}$ lbs.

List in effect July 21, 1911.

ALWAYS GIVE ASSORTMENT NUMBER WHEN ORDERING



Flat Riveted Keys

SIXTY-NINE DIFFERENT SIZES AND PATTERNS

Prices and Catalog on Application



Flat Spring Keys



Size Ins.	List Price Per 1000	Quantity	Approx. Weight Per 1000	Size Ins.	List Price Per 1000	Quantity	Approx. Weight per 1000
			LBS.				LBS.
$\frac{3}{8}$ x $1\frac{1}{4}$	\$ 39.00	Bulk	17	$\frac{5}{8}$ x $1\frac{3}{4}$	\$ 78.00	Bulk	43
$\frac{3}{8}$ x $1\frac{1}{2}$	44.50	"	21	$\frac{5}{8}$ x 2	84.50	"	45
$\frac{3}{8}$ x $1\frac{3}{4}$	50.00	"	26	$\frac{5}{8}$ x $2\frac{1}{4}$	91.00	"	50
$\frac{3}{8}$ x 2	55.50	"	29	$\frac{5}{8}$ x $2\frac{1}{2}$	97.50	"	55
$\frac{3}{8}$ x $2\frac{1}{4}$	61.00	"	31	$\frac{5}{8}$ x $2\frac{3}{4}$	104.00	"	58
$\frac{3}{8}$ x $2\frac{1}{2}$	66.50	"	33	$\frac{5}{8}$ x 3	110.50	"	62
$\frac{3}{8}$ x $2\frac{3}{4}$	72.00	"	37	$\frac{5}{8}$ x $3\frac{1}{4}$	117.00	"	65
$\frac{3}{8}$ x 3	77.50	"	39	$\frac{5}{8}$ x $3\frac{1}{2}$	123.50	"	70
$\frac{1}{2}$ x $1\frac{1}{4}$	52.00	"	35	$\frac{3}{4}$ x 2	104.00	"	50
$\frac{1}{2}$ x $1\frac{1}{2}$	58.00	"	38	$\frac{3}{4}$ x $2\frac{1}{4}$	111.00	"	57
$\frac{1}{2}$ x $1\frac{3}{4}$	64.00	"	42	$\frac{3}{4}$ x $2\frac{1}{2}$	118.00	"	63
$\frac{1}{2}$ x 2	70.00	"	44	$\frac{3}{4}$ x $2\frac{3}{4}$	125.00	"	65
$\frac{1}{2}$ x $2\frac{1}{4}$	76.00	"	46	$\frac{3}{4}$ x 3	132.00	"	69
$\frac{1}{2}$ x $2\frac{1}{2}$	82.00	"	48	$\frac{3}{4}$ x $3\frac{1}{4}$	139.00	"	73
$\frac{1}{2}$ x $2\frac{3}{4}$	88.00	"	51	$\frac{3}{4}$ x $3\frac{1}{2}$	146.00	"	77
$\frac{1}{2}$ x 3	94.00	"	55				

ALWAYS GIVE LIST NUMBER WHEN ORDERING

"W. & B." Warranted Files



Price List in Effect November 1, 1899
PRICE PER DOZEN

INCH	MILL AND ROUND			FLAT			INCH	SQUARE			HAND AND PILLAR		
	Bas'd	2nd Cut	Sm'th	Bas'd	2nd Cut	Sm'th		Bas'd	2nd Cut	Sm'th	Bas'd	2nd Cut	Sm'th
4	3.00	3.50	3.90	3.70	4.30	4.70	4	3.80	4.60	4.90	3.70	4.30	4.80
5	3.20	3.80	4.10	3.90	4.60	4.90	5	4.10	4.80	5.30	3.90	4.70	5.30
6	3.50	4.00	4.50	4.30	4.80	5.30	6	4.60	5.10	5.50	4.30	5.10	5.60
7	3.90	4.60	4.90	4.80	5.50	6.10	7	5.10	5.80	6.30	4.90	5.80	6.30
8	4.30	4.90	5.40	5.30	6.10	6.60	8	5.50	6.30	7.00	5.40	6.30	6.70
9	4.90	5.80	6.30	6.30	7.20	7.90	9	6.60	7.70	8.30	6.70	7.80	8.30
10	5.60	6.40	7.00	7.00	8.10	8.70	10	7.40	8.50	9.10	7.50	8.70	9.40
11	6.70	7.80	8.50	8.60	9.80	10.70	11	9.10	10.40	11.30	9.40	10.90	11.80
12	7.50	8.60	9.40	9.70	11.00	12.10	12	10.20	11.50	12.80	10.70	12.30	13.50
13	9.40	10.70	11.70	11.80	13.60	14.70	13	12.50	14.30	15.40	13.30	15.20	16.20
14	10.70	12.20	13.10	13.30	15.30	16.70	14	13.90	16.10	17.50	15.00	17.00	18.20
15	13.10	15.00	16.10	16.00	18.30	20.00	15	16.90	19.20	20.90	17.90	20.60	21.70
16	14.70	16.80	17.90	17.80	20.10	22.30	16	18.70	21.20	23.30	20.10	22.80	24.20
17	18.20	20.20	21.70	21.50	24.20	26.50	17	22.50	25.40	27.50	24.20	27.10	28.60
18	20.20	22.70	24.30	23.90	26.80	29.20	18	25.10	28.20	30.40	26.80	29.90	31.50
19	24.60	27.50	29.40	28.40	31.60	34.60	19	29.70	33.20	35.70	31.90	35.40	37.60
20	27.40	30.70	32.90	31.50	35.30	38.30	20	32.80	36.70	39.30	35.10	39.20	41.60

Mill Blunt, Double Cut, advance 2 in.
Mill Double Cut, advance 1 in.
Mill Narrow Point, advance 1 in.

Cant (Blunt)
Double Cut,
advance 2 in.

Square Blunt, advance 1 in.

Slotting (Blunt)
advance 2 in.
Cutter Blunt or Taper,
advance 2 in.

INCH	Hil Rd. & Three Sq.			WARDING			INCH	MILL ONE ROUND EDGE			MILL TWO RD. EDGES		
	Bas'd	2nd Cut	Sm'th	Bas'd	2nd Cut	Sm'th		Bas'd	2nd Cut	Sm'th	Bas'd	2nd Cut	Sm'th
4	4.80	5.60	6.10	4.00	4.80	5.40	4	3.40	3.90	4.40	3.80	4.40	4.90
5	5.40	6.10	6.40	4.50	5.30	5.80	5	3.60	4.30	4.60	4.00	4.80	5.10
6	6.10	6.70	7.10	4.90	5.90	6.40	6	3.90	4.50	5.10	4.40	5.00	5.60
7	7.00	7.70	8.20	5.90	6.90	7.50	7	4.40	5.20	5.50	4.90	5.80	6.10
8	7.50	8.30	8.90	6.40	7.50	8.20	8	4.80	5.50	6.10	5.40	6.10	6.80
9	8.50	9.40	9.90	7.80	9.00	9.90	9	5.50	6.50	7.10	6.10	7.30	7.90
10	9.10	10.10	10.70	8.70	10.10	11.00	10	6.30	7.20	7.90	7.00	8.00	8.80
11	10.70	11.80	12.70	10.90	12.70	13.70	11	7.50	8.80	9.60	8.40	9.80	10.60
12	11.80	13.00	13.90	12.30	14.30	15.40	12	8.40	9.70	10.60	9.40	10.80	11.80
13	14.10	15.40	16.60	15.20	17.40	18.70	13	10.60	12.00	13.20	11.80	13.40	14.60
14	15.50	17.00	18.30	17.00	19.40	21.00	14	12.00	13.70	14.70	13.40	15.30	16.40
15	18.50	20.40	21.70				15	14.70	16.90	18.10	16.40	18.80	20.10
16	20.60	22.50	24.20				16	16.50	18.90	20.10	18.40	21.00	22.40
17	24.70	27.00	28.90				17	20.50	22.70	24.40	22.80	25.30	27.10
18	27.50	29.90	32.00				18	22.70	25.50	27.30	25.30	28.40	30.40
19	32.80	35.70	38.10										
20	36.20	39.40	42.30										

STAVESAW
8 inch, - \$9.40

STAVESAW IMP'D
6 inch - \$6.40
7 " - 7.40
8 " - 8.10
9 " - 9.70
10 " - 10.70
12 " - 15.40

Ginsaw, Lake Bastard Price
Crossing, - - - adv. 2 in.
Tumbler, - - - " 2"
Feather Edge (Blunt) " 2"
High Back, - - - " 2"
Half Round }

(Continued next page)



"W. & B." Warranted Files

INCH	TAPERS		SLIM TAPERS		BANDSAW B'l't & Tap'r		INCH	PIT SAW	CANT SAW	CROSS-CUT	HOOK TOOTH	PLANNER KNIFE	Inside Tooth or Chisel Tooth
	Single Cut	Double Cut	Single Cut	Double Cut	Regular	Slim							
3	2.10	2.50	2.10	2.50	2.50	2.50	4	4.80	4.30	4.80	.....	.....	.....
3½	2.10	2.50	2.10	2.50	2.50	2.50	5	5.40	4.70	5.40	.....	.....	.....
4	2.20	2.90	2.20	2.60	2.90	2.60	6	6.10	5.40	6.10	6.70	.....	.....
4½	2.40	3.10	2.30	3.00	3.10	3.00	7	7.00	6.10	7.00	7.70	.....	.....
5	2.60	3.50	2.50	3.20	3.50	3.20	8	7.50	6.40	7.50	8.30	6.40	8.30
5½	3.00	4.00	2.90	3.50	4.00	3.50	9	8.50	7.80	8.50	9.40	.....	9.40
6	3.40	4.70	3.10	3.90	4.70	3.90	10	9.10	8.70	9.10	10.10	8.60	10.10
7	4.30	5.60	3.80	4.50	5.60	4.50	11	10.70	10.40	10.70	11.80	.....	.....
8	5.40	6.70	4.50	5.30	6.70	5.30	12	11.80	11.40	11.80	13.00	12.10	.....
9	6.60	8.10	5.40	6.30	8.10	6.30	Climax, adv. 2 in. on Hlf. Rd. Bastard. Round Gulleting, take Pitsaw Price.						
10	8.10	9.70	6.40	7.50	9.70	7.50	DOUBLE ENDED TAPER WITH HANDLE						
11	10.70	12.10	8.30	9.10	12.10	9.10	7	8	9	10			
12	12.50	14.70	9.50	11.00	14.70	11.00	3.50	3.90	4.40	4.90			
13	15.90	17.50	12.10	13.10	17.50	13.10							
14	18.20	20.60	13.80	15.40	20.60	15.40							

INCH	HORSE RASPS			FILE RASPS		INCH	WOOD FILES			WOOD RASPS		
	Plain	Bev'd & 3-4 Rasp	Tng'd	Flat	H. R.		Flat	H. R.	Cabinet	Flat	H. R.	Cabinet
6	.....	.....	.....	7.40	8.10	6	4.30	6.10	8.10	7.40	8.10	10.10
7	.....	.....	.....	8.60	9.30	7	4.80	7.00	9.30	8.60	9.30	11.70
8	.....	.....	.....	9.40	10.10	8	5.30	7.50	10.10	9.40	10.10	12.80
9	.....	.....	.....	11.40	12.20	9	6.30	8.50	12.20	11.40	12.20	15.50
10	9.40	10.70	12.80	12.80	13.70	10	7.00	9.10	13.70	12.80	13.70	17.50
11	11.40	12.90	15.20	15.50	16.80	11	8.60	10.70	16.80	15.50	16.80	20.70
12	12.80	14.40	16.80	17.50	18.70	12	9.70	11.80	18.70	17.50	18.70	22.80
13	15.20	17.00	19.60	20.90	22.40	13	11.80	14.10	22.40	20.90	22.40	26.80
14	17.80	20.10	23.10	23.20	24.80	14	13.30	15.50	24.80	23.20	24.80	29.60
15	20.90	23.60	27.30	27.80	29.70	15	16.00	18.50	29.70	27.80	29.70	33.90
16	24.40	27.50	32.20	30.80	32.90	16	17.80	20.60	32.90	30.80	32.90	36.90
17	28.90	31.50	.....	36.20	38.90	17	21.50	24.70	38.90	36.20	38.90	42.40
18	32.90	36.20	.....	40.90	43.60	18	23.90	27.50	43.60	40.90	43.60	46.90

INCH	SHOE RASPS			INCH	KNIFE		
	Flat	H. R.	Oval		Bas'd	2d Cut	Sm'th
6	8.10	8.10	9.30	4	5.40	6.10	6.40
7	9.30	9.30	10.10	5	6.10	6.70	7.10
8	10.10	10.10	12.20	6	6.90	7.50	7.90
9	12.20	12.20	13.70	7	7.80	8.50	8.90
10	13.70	13.70	16.80	8	8.50	9.10	9.50
11	16.80	16.80	18.70	9	9.40	10.60	11.30
12	18.70	18.70	22.40	10	10.10	11.50	12.30
13	22.40	22.40	.....	11	12.20	13.70	14.60
14	24.80	24.80	.....	12	13.70	15.20	16.10
LAST MAKERS' RASPS				13	16.30	17.90	19.20
1 in. adv. on Cab. Rasp.				14	18.20	19.90	21.20

Sizes below 4 inches, not extended, take 4 inch price.
 Half inches, not specified, take next higher full inch price.
 Dead Smooth, double the price of Bastard Cut
 One Round Edge, advance 12½ per cent.
 All Lengths above those listed, advance 20 per cent. on next lower inch price.
 Blunt Files, not specified, advance one inch on respective kinds and cuts.
 Single or Float Cut not specified, on regular shapes take Double Cut price.
 Equalings (Bellied), advance two inches on respective kinds and cuts.
 Two Round Edges, advance 25 per cent.
 Files Varying from standard sizes, subject to special prices.
 Cuts not Specified, made upon regular blanks, advance one inch on respective kinds and nearest cut.

PACKING AND APPROXIMATE WEIGHTS OF FINISHED DROP FORGED WRENCHES

Engineers' Wrenches

SINGLE HEAD

No.	Weights Per Dozen		Packed	No.	Weights Per Dozen		Packed
	lbs.	oz.			lbs.	oz.	
00		6 $\frac{3}{4}$	Env 12 in paper box	14	128	10	Wp'd in paper, bulk
0		12	" " " " " "	15	150		" " " " " "
1	1	1	" " " " " "	16	179		" " " " " "
2	2	5	" 6 " " " "	16 $\frac{1}{2}$	181	2	" " " " " "
3	2	9	" " " " " "	17	259		" " " " " "
4	5		" " " " " "	18	369		" " " " " "
5	6	15	" " " " " "	19	507		" " " " " "
6	8	13	" " " " " "	19 $\frac{1}{2}$	507		" " " " " "
7	11	12	Env in bulk	20	633		" " " " " "
8	21	8	" " " " " "	20A	633		" " " " " "
9	33	13	" " " " " "	20B	700		" " " " " "
10	50	5	" " " " " "	20C	700		" " " " " "
11	60		Wp'd in paper, bulk	20D	750		" " " " " "
12	74	2	" " " " " "	20E	750		" " " " " "
13	109	12	" " " " " "	20F	750		" " " " " "

Engineers' Wrenches

DOUBLE HEAD

No.	Weights Per Dozen		Packed	No.	Weights Per Dozen		Packed
	lbs.	oz.			lbs.	oz.	
21		15	Env 12 in paper box	40	53		Wp'd in paper, bulk
22	1	5	" " " " " "	41	53		" " " " " "
23	1	5	" " " " " "	42	75		" " " " " "
24	3		" 6 " " " "	43	75		" " " " " "
25	3		" " " " " "	44	87		" " " " " "
26	3	4	" " " " " "	45	87		" " " " " "
27	3	4	" " " " " "	46	113	8	" " " " " "
28	4	13	" " " " " "	47	113	8	" " " " " "
29	4	13	" " " " " "	48	140		" " " " " "
30	6	15	" " " " " "	49	140		" " " " " "
31	6	15	" " " " " "	50	167		" " " " " "
32	9	6	" " " " " "	51	167		" " " " " "
33	9	6	" " " " " "	52	193	8	" " " " " "
34	13	9	Env. in bulk	53	193		" " " " " "
35	13	9	" " " " " "	54	292		" " " " " "
36	23		" " " " " "	55	292		" " " " " "
37	23		" " " " " "	56	369		" " " " " "
38	37	10	" " " " " "	57	369		" " " " " "
39	37	10	" " " " " "				" " " " " "

Hexagon Cap Screw Wrenches

SINGLE HEAD

No.	Weights Per Dozen		Packed	No.	Weights Per Dozen		Packed
	lbs.	oz.			lbs.	oz.	
700		12	Env 12 in paper box	705	6	15	Env. 6 in paper box
701	1	1	" " " " " "	705A	6	15	" " " " " "
701A	1	1	" " " " " "	706	8	13	" " " " " "
702	2	5	" 6 " " " "	707	11	12	Env in bulk
703	3	9	" " " " " "	708	21	8	" " " " " "
704	5		" " " " " "				" " " " " "

UNFINISHED AND SEMI-FINISHED WRENCHES SHIPPED IN BULK UNLESS OTHERWISE SPECIFIED.



PACKING AND APPROXIMATE WEIGHTS OF FINISHED DROP FORGED WRENCHES

Hexagon Cap Screw Wrenches

DOUBLE HEAD

No.	Weights Per Dozen		Packed	No.	Weights Per Dozen		Packed
	lbs.	oz.			lbs.	oz.	
723	1	5	Env. 12 in paper box	731	6	15	Env. 6 in paper box
723A	1	5	" " " " " "	731A	6	15	" " " " " "
724	3		" " " " " "	731B	6	15	" " " " " "
725	3		" " " " " "	732	9	6	" " " " " "
725A	3		" " " " " "	732A	9	6	" " " " " "
725B	3		" " " " " "	733	9	6	" " " " " "
726	3	4	" " " " " "	734	13	9	Env. in bulk
727	3	4	" " " " " "	735	13	9	" " " " " "
728	4	13	" " " " " "	736	23		" " " " " "
729	4	13	" " " " " "	737	23		" " " " " "
730	6	15	" " " " " "				

Double Head "S" Wrenches

FOR U. S. STANDARD NUTS

No.	Weights Per Dozen		Packed	No.	Weights Per Dozen		Packed
	lbs.	oz.			lbs.	oz.	
661A	1	4	Env. in bulk	665A	16	8	Env. in bulk
661B	1	4	" " " "	665B	16	8	" " " "
661C	1	4	" " " "	665C	16	8	" " " "
662A	2	4	" " " "	666A	20	14	" " " "
662B	2	4	" " " "	666B	20	14	" " " "
662C	2	4	" " " "	666C	20	14	" " " "
663A	5	3	" " " "	667A	31	12	" " " "
663B	5	3	" " " "	667B	31	12	" " " "
663C	5	3	" " " "	667C	31	12	" " " "
664A	8	8	" " " "	668A	56	4	" " " "
664B	8	8	" " " "	668B	56	4	" " " "
664C	8	8	" " " "	668C	56	4	" " " "

Double Head "S" Wrenches

FOR HEXAGON HEAD CAP SCREWS

No.	Weights Per Dozen		Packed	No.	Weights Per Dozen		Packed
	lbs.	oz.			lbs.	oz.	
671A	1	4	Env. in bulk	674A	8	8	Env. in bulk
671B	1	4	" " " "	674B	8	8	" " " "
671C	1	4	" " " "	674C	8	8	" " " "
671D	1	4	" " " "	675A	16	8	" " " "
672A	2	4	" " " "	675B	16	8	" " " "
672B	2	4	" " " "	675C	16	8	" " " "
672C	2	4	" " " "	675D	16	8	" " " "
672D	2	4	" " " "	676A	20	14	" " " "
673A	5	3	" " " "	676B	20	14	" " " "
673B	5	3	" " " "	676C	20	14	" " " "
673C	5	3	" " " "	677A	31	12	" " " "
673D	5	3	" " " "	677B	31	12	" " " "
				677C	31	12	" " " "

UNFINISHED AND SEMI-FINISHED WRENCHES SHIPPED IN BULK UNLESS OTHERWISE SPECIFIED.

PACKING AND APPROXIMATE WEIGHTS OF FINISHED DROP FORGED WRENCHES

Double Head "S" Wrenches

FOR SQUARE HEAD CAP SCREWS

No.	Weights Per Dozen		Packed	No.	Weights Per Dozen		Packed
	lbs.	oz.			lbs.	oz.	
682A	2	4	Env. in bulk	684D	8	8	Env. in bulk
682B	2	4		685A	16	8	
682C	2	4		686A	20	14	
682D	2	4		686B	20	14	
683A	5	3		686C	20	14	
683B	5	3		687A	31	12	
683C	5	3		687B	31	12	
683D	5	3		687C	31	12	
684A	8	8		688A	56	4	
684B	8	8		688B	56	4	
684C	8	8					

Double Head "S" Wrenches

FOR SET SCREWS

No.	Weights Per Dozen		Packed	No.	Weights Per Dozen		Packed
	lbs.	oz.			lbs.	oz.	
691A	1	4	Env. in bulk	694A	8	8	Env. in bulk
691B	1	4		694B	8	8	
691C	1	4		694C	8	8	
691D	1	4		695A	16	8	
692A	2	4		695B	16	8	
692B	2	4		695C	16	8	
692C	2	4		696A	20	14	
692D	2	4		696B	20	14	
693A	5	3		696C	20	14	
693B	5	3		697A	31	4	
693C	5	3					

Double Head "S" Wrenches

No.	Weights Per Dozen		Packed	No.	Weights Per Dozen		Packed
	lbs.	oz.			lbs.	oz.	
220	1	10	Env. 6 in paper box	223	8	10	Env. 6 in paper box
221	3	1		224	14	13	
222	5	7		225	18	4	

Check Nut Wrenches

SINGLE HEAD

No.	Weights Per Dozen		Packed	No.	Weights Per Dozen		Packed
	lbs.	oz.			lbs.	oz.	
800	1	3	Env. in bulk	805	8	Env. in bulk	
801	2	9		806	14		8
802	2	9		807	21		10
803	4	4		808	30		4
804	5	8					

UNFINISHED AND SEMI-FINISHED WRENCHES SHIPPED IN BULK UNLESS OTHERWISE SPECIFIED.



PACKING AND APPROXIMATE WEIGHTS OF FINISHED DROP FORGED WRENCHES

Check Nut Wrenches

DOUBLE HEAD

No.	Weights Per Doz.		Packed	No.	Weights Per Doz.		Packed	No.	Weights Per Doz.		Packed
	lbs.	oz.			lbs.	oz.			lbs.	oz.	
819	1	5	Env. in bulk	825	4	9	Env. in bulk	831	12		Env. in bulk
820	1	5	" " "	826	4	9	" " "	832	12		" " "
821	1	5	" " "	827	4	9	" " "	833	12		" " "
822	2	4	" " "	828	7	2	" " "	834	25	4	" " "
823	2	4	" " "	829	7	2	" " "	835	25	4	" " "
824	2	4	" " "	830	7	2	" " "	836	25	4	" " "

General Purpose Wrenches in Sets

Wood Boxes		Weights Per Set		Canvas Roll		Weights Per Set	
		lbs.	oz.			lbs.	oz.
Set "A"	.....	3		Set "A"	.....	2	13
Set "B"	.....	1	14	Set "B"	.....	1	12
Set "C"	.....	1	7	Set "C"	.....	1	4
Set "D"	.....	4	13	Set "D"	.....	4	2
Set "E"	.....	5		Set "E"	.....	4	8
Set "F"	.....	3	5	Set "F"	.....	3	4

General Purpose Wrenches

No.	Weights Per Dozen		Packed	No.	Weights Per Dozen		Packed
	lbs.	oz.			lbs.	oz.	
500	2	1	Env. in bulk	503	8		Env. in bulk
500A	2	1	" " "	503A	8		" " "
500B	2	1	" " "	503B	8		" " "
500C	2	1	" " "	503C	8		" " "
501	3	2	" " "	504	12	1	" " "
501A	3	2	" " "	504A	12	1	" " "
501B	3	2	" " "	504B	12	1	" " "
501C	3	2	" " "	505	18	11	" " "
502	5	3	" " "	505A	18	11	" " "
502A	5	3	" " "	505B	18	11	" " "
502B	5	3	" " "	505C	18	11	" " "
502C	5	3	" " "				

Double Head Wrenches in Sets

Wood Boxes		Weights Per Set		Canvas Roll		Weights Per Set	
		lbs.	oz.			lbs.	oz.
Set No. 1	.....	5		Set No. 1	.....	4	9
Set No. 2	.....	5		Set No. 2	.....	4	9

Textile Machine Wrenches in Sets

Wood Boxes		Weight Per Set		Canvas Roll		Weight Per Set	
		lbs.	oz.			lbs.	oz.
Textile set	.....	3		Textile set	.....	2	13

UNFINISHED AND SEMI-FINISHED WRENCHES SHIPPED IN BULK UNLESS OTHERWISE SPECIFIED.

PACKING AND APPROXIMATE WEIGHTS OF FINISHED DROP FORGED WRENCHES

Double Head Angle Wrenches

No.	Weights Per Doz.		Packed	No.	Weights Per Doz.		Packed
	lbs.	oz.			lbs.	oz.	
600	2	2	Env. in bulk	613	6		Env. in bulk
601	2	2	" " "	614	6		" " "
602	2	2	" " "	615	9	7	" " "
603	2	2	" " "	616	9	7	" " "
604	3	10	" " "	617	9	7	" " "
605	3	10	" " "	618	9	7	" " "
606	3	10	" " "	619	11	5	" " "
607	3	10	" " "	620	11	5	" " "
608	3	10	" " "	621	11	5	" " "
609	3	10	" " "	622	11	5	" " "
610	3	10	" " "	623	18	2	" " "
611	6		" " "	624	18	9	" " "
612	6		" " "				

Single Head Set Screw Wrenches

No.	Weights Per Dozen		Packed	No.	Weights Per Dozen		Packed
	lbs.	oz.			lbs.	oz.	
280		9	Env. 6 in paper box	286	8	3	Env. 6 in paper box
281	1	4	" " " " "	287	10	5	" " " " "
282	2	2	" " " " "	288	13	2	W'p'd in paper, bulk
283	3	7	" " " " "	289	23	6	" " " " "
284	4	9	" " " " "	290	26	8	" " " " "
285	7	1	" " " " "	291	32	12	" " " " "

Double Head Tool Post Wrenches

For U. S. Standard Nuts and Set Screws

For Set Screws

No.	Weights Per Dozen		Packed	No.	Weights Per Dozen		Packed
	lbs.	oz.			lbs.	oz.	
124	7	2	Env. in bulk	201	5	3	Env. in bulk
129	10		" " " " "	202	6	3	" " " " "
131	10		" " " " "	203	6	3	" " " " "
132	10		" " " " "	204	9	10	" " " " "
139	12		" " " " "	205	9	10	" " " " "
140	13	8	" " " " "	206	10	10	" " " " "
143	19	6	" " " " "				

Single Head Box Wrench

No.	Weights Per Dozen		Packed	No.	Weights Per Dozen		Packed
	lbs.	oz.			lbs.	oz.	
250		15	Env. 12 in paper box	255	4	6	Env. 6 in paper box
251	1	6	" " " " "	256	6	12	" " " " "
252	1	12	" " " " "	257	8	7	" " " " "
253	2	6	" 6 " " "	258	13	4	Env. in bulk
254	3	13	" " " " "	259	17	4	" " " " "

UNFINISHED AND SEMI-FINISHED WRENCHES SHIPPED IN BULK UNLESS OTHERWISE SPECIFIED.



PACKING AND APPROXIMATE WEIGHTS OF FINISHED DROP FORGED WRENCHES

Double Head Set Screw Wrenches

No.	Weights Per Dozen		Packed	No.	Weights Per Dozen		Packed
	lbs.	oz.			lbs.	oz.	
65	1	1	Env. 12 in paper box	74	5	10	Env. 6 in paper box
66	1	1	" " " " "	75	8	3	" " " " "
67	1	10	" 6 " " "	76	8	3	" " " " "
68	1	10	" " " " "	77	10	6	Env. in bulk
69	2	14	" " " " "	78	10	6	" " " " "
70	2	14	" " " " "	79	16	4	" " " " "
71	4	3	" " " " "	80	16	4	" " " " "
72	4	3	" " " " "	81	22	8	" " " " "
73	5	10	" " " " "	82	22	8	" " " " "

Construction and Car Builders' Wrenches

No.	Weights Per Dozen		Packed	No.	Weights Per Dozen		Packed
	lbs.	oz.			lbs.	oz.	
454	18	15	Packed in bulk	456	36	8	Packed in bulk
455	26	10	" " " "	457	52		" " " "

Structural Wrenches With Offset

No.	Weights Per Dozen		Packed	No.	Weights Per Dozen		Packed
	lbs.	oz.			lbs.	oz.	
478	3	2	Packed in bulk	483	12	14	Packed in bulk
479	3	2	" " " "	484	19	1	" " " "
480	5	3	" " " "	485	27	14	" " " "
481	5	3	" " " "	486	38		" " " "
482	10	6	" " " "	487	51	12	" " " "

Car Builders' Wrenches DOUBLE HEAD

No.	Weights Per Dozen		Packed	No.	Weights Per Dozen		Packed
	lbs.	oz.			lbs.	oz.	
515	16	13	Packed in bulk	524	60		Packed in bulk
516	42		" " "	525	60		" " "
517	42		" " "	526	63	4	" " "
518	44		" " "	527	63	4	" " "
519	44		" " "	528	63	4	" " "
520	48		" " "	529	70		" " "
521	48		" " "	530	70		" " "
522	48		" " "	531	108	4	" " "
523	60		" " "	532	116	8	" " "

Unfinished and semi-finished wrenches shipped in bulk unless otherwise specified

"Bull Dog" Wrenches

No.	Weights Per Dozen		Packed	No.	Weights Per Dozen		Packed
	lbs.	oz.			lbs.	oz.	
0	1	4	Env 12 in box	2½	18	6	Bulk
1	3	12	" " " "	3	33	15	"
1½	3	11	" 6 " " "	3½	48	10	"
1¾	8	2	" " " " "	4	77	4	"
2	11	1	" " " " "	4½	122	2	"
Twin	11	6	" " " " "	5	150	2	"

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regular
regular
regular

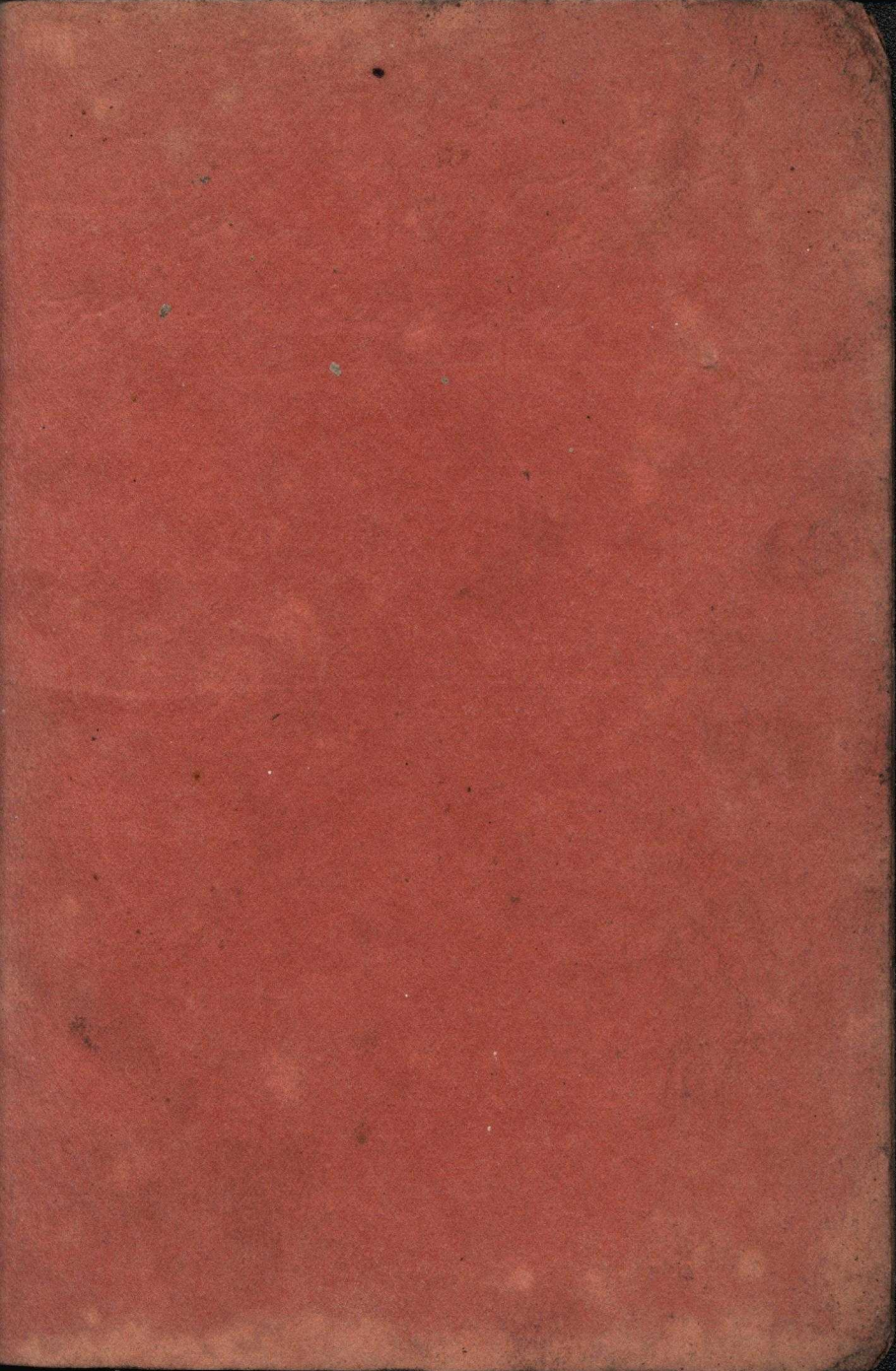
Tripple valve.

What it does
sets the brakes releases the
brake and fills the
oxyghen reservoir

Running fits		Force fits	
Diam of bearing	Diam of shaft	Diam of hole	Diam of shaft
1	1.999	1	1.001
2	1.998	2	2.003
3	2.997	3	3.005
4	3.9965	4	4.006
5	4.9963	5	5.007
6	5.996	6	6.008
7	6.9958	7	7.0085
8	7.9958	8	8.009
9	8.9957	9	9.01
10	9.9956	10	10.0100
11	10.9955	11	11.011
12	11.9954	12	12.0115
13	12.9953	13	13.012
14	13.9952	14	14.013
15	14.9951	15	15.014
16	15.995	16	16.0145
17	16.9949	17	17.015
18	17.9948	18	18.0155
19	18.9947	19	19.016
20	19.9945	20	20.017

Running fits force fits

Allowances for drive fits
are only half that of force
fits.



to find out the gears to
cut threads, (take example)
say we have a 9 thread
to cut and the feed
screw on the lathe was
4 threads to the inch
Divide 9 by 4 = $2\frac{1}{4}$ larger
on the spindle than on the
screw, say we have a 48 gear on
spindle we have a 72 on screw

To fit rod bushings
Leave $\frac{1}{4}$ " bigger than the
hole and $\frac{3}{4}$ " bigger than
the pin. $\frac{1}{32}$ " for play.

To fit Hub liners
Allow $\frac{1}{4}$ " smaller than
the in wheel and $\frac{1}{64}$ "
bigger than a pin

